MODERN Machine Shop



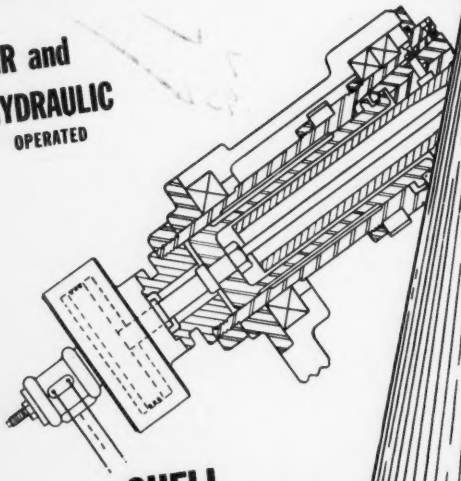
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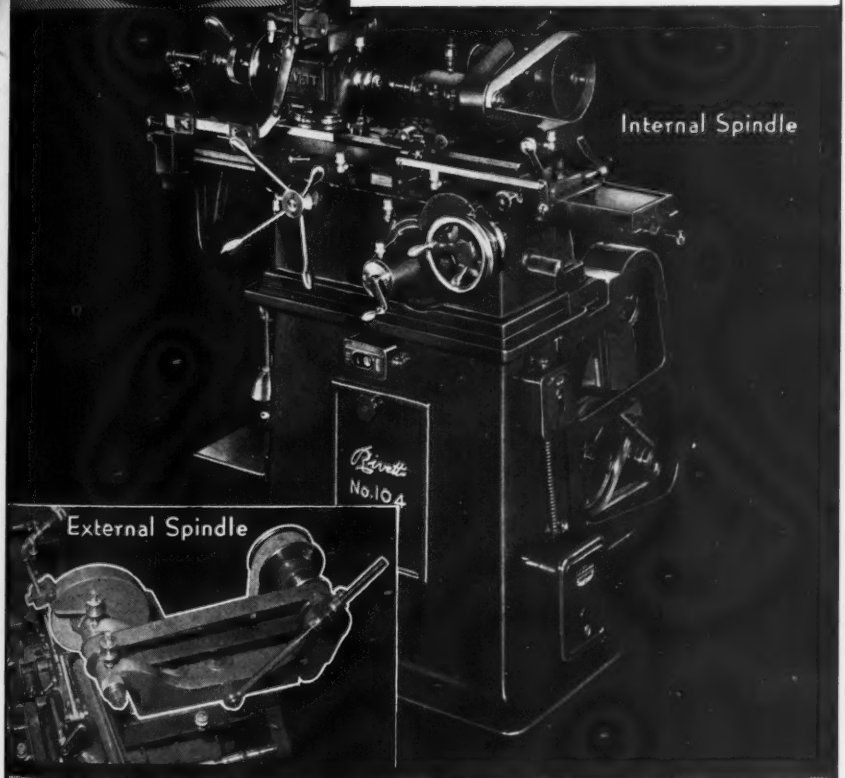
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MODERN Machine Shop

HOWARD CAMPBELL, Editor

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MODERN
Machine Shop

CINCINNATI, OHIO

OCTOBER, 1940 VOL. 13, NO. 5

We Present---

—as this month's feature article—a number of the interesting operations involved in the manufacture of modern home laundry equipment. Inasmuch as the General Electric Company is one of the largest producers of "machinery for easier and better housekeeping," the operations illustrated and described here are indicative of the best modern manufacturing practice.

—on page 72, the third article by Lawrence S. Martz in which he presents an exposition of "Microfinish—What It Is and How It Is Used." The great number of requests we have had for extra copies of the issues containing these articles clearly indicate that manufacturers of all kinds of mechanical products are interested in better finishing methods.

—another in the series explaining "The General-Purpose Use of Carbide Tools." Here is another series which has met with so much favor that it is very likely that reprints of this series will be made available. In these days when speed is so essential, carbide tools are proving their worth.

—announcements of the 1940 Metal Congress and Exposition which is to be held at Cleveland, Ohio, for five days beginning October 21st, and of the Fall Meeting of the American Society of Tool Engineers which is to be held at Cincinnati, Ohio, October 17th, 18th and 19th.

—in the "Modern Equipment at Work" section descriptions of some good tools for use in shell manufacturing and locomotive maintenance, and in the "Ideas from Readers" section a number of unusually good tools and devices which have been developed to meet special needs in various plants.

—a very handy service in our "Where to Find It" section on page 256. By referring to this section the reader can immediately locate advertisements of tools in which he is particularly interested.

Don't forget to see Wesser's cartoon "There's One in Every Shop." Page 260.

Building the General Electric Washing Machine

. . . . By . . . .
W. CHESTER ROBINSON
Tool Section,
General Electric Company,
Bridgeport, Conn.

IT is a far cry from the wooden wash-tub of grandmother's day, with its hand-operated wringer, to the modern enameled steel motor-operated washer with its mechanically-operated wringer or spinner. However, the production of the ancient tub involved the use of no more than two or three wood-working machines and two or three hand operations, whereas the manufacture of the modern home laundry machine necessitates the employment of steel cutting and forming machines, automatic cleaning and degreasing equipment, enameling and lacquer-drying ovens, stamping and forming presses, drilling, milling, tapping, welding, and other metal-working machines.

In the front rank of manufacturers of modern laundry equipment is the General Electric Company, with a huge plant at Bridgeport, Connecticut, devoted to the manufacture of electric washing machines and similar products. This article presents some of the more interesting operations in the manufacture of the General Electric Washing Machine.

Both the tub proper and the skirt which encloses the mechanism below the tub are of heavy sheet steel, the tub being drawn while the skirt is rolled to circular shape in the machine shown in operation in Fig. 1. Here the operator is shown rolling a skirt which is made from 0.040 in. thick steel. For one model of machine, the skirt is 8¾ in. wide by 69½ in. long, which is correct for a skirt of the diameter required.

After being rolled to shape, the ends of the skirt strip are lapped to $\frac{3}{16}$ in.



Fig. 1 — Rolling the Skirt to Shape

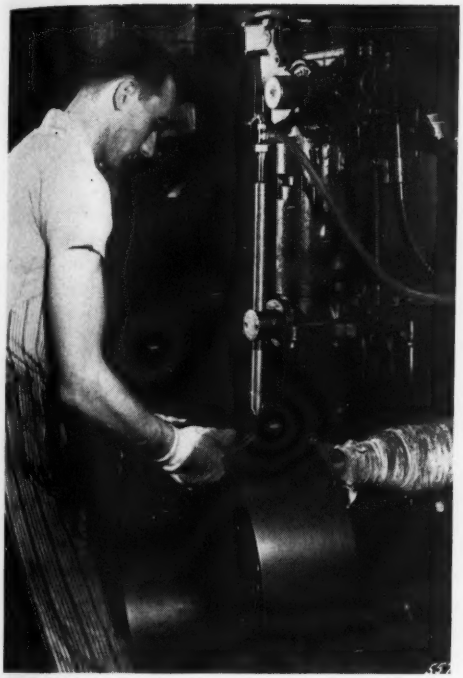


Fig. 2—Six Spot-Welds at the Joint Ensure Permanent Construction for the Skirt

and are then welded with the aid of the spot welding machine shown in Fig. 2. The lap is welded at six points, which is sufficient to ensure permanent construction.

The legs for the washing machine blanked, formed and trimmed in a progressive die set up in a heavy duty hydraulic press, as shown in Fig. 3, the three operations being performed simultaneously. In a previous operation the stock from which the blanks are to be stamped has been cut into pieces each 7 x 19¼ in. in size. A piece of the correct size is given the first draw on one die after which it is transferred to the trimming die shown on the right in the illustration. The leg is then turned over and positioned on the center die which produces the final form. In operation, a finished leg is produced with each operation of the press.

In the illustration Fig. 4 an operator is shown welding the legs to the skirt of a washing machine. Using a fixture into which a leg is set so that it will be held at the exact angle required, the skirt is

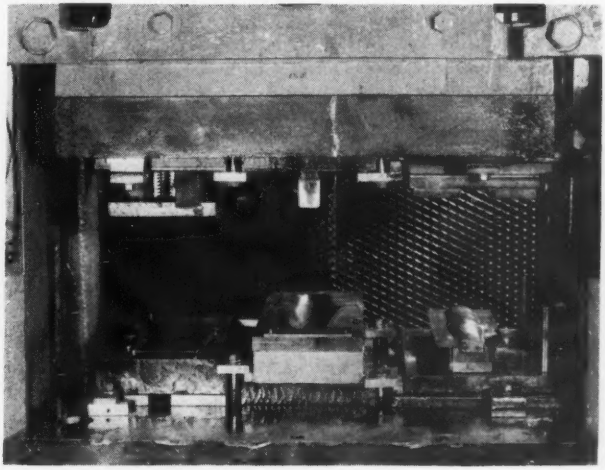


Fig. 3—Hydraulic Press with Progressive Die for Blanking, Forming, and Trimming the Washing Machine Legs



Fig. 4 — Welding Leg to Washing Machine Skirt. Fixture Holds Leg at Correct Angle

positioned and four welds are made in each of two different locations on the leg. The welding operation fuses the metal of the parts to form one solid piece, thus ensuring more rigid construction. This eliminates the necessity for drilling holes and saves the expense of rivets in addition to producing a higher quality of product.

Inasmuch as the gear case must be sufficiently rigid to maintain the alignment of the gears and the shafts upon which they operate, the case is made of a die casting. Among the operations in the processing of the gear case is that of tapping 13 holes with a ¼-in. 28-thread tap for the screws with which the gear case cover is fastened to the case. The tapping operation, shown in Fig. 5, is performed with a single spindle drill, equipped with a multiple spindle drill head.

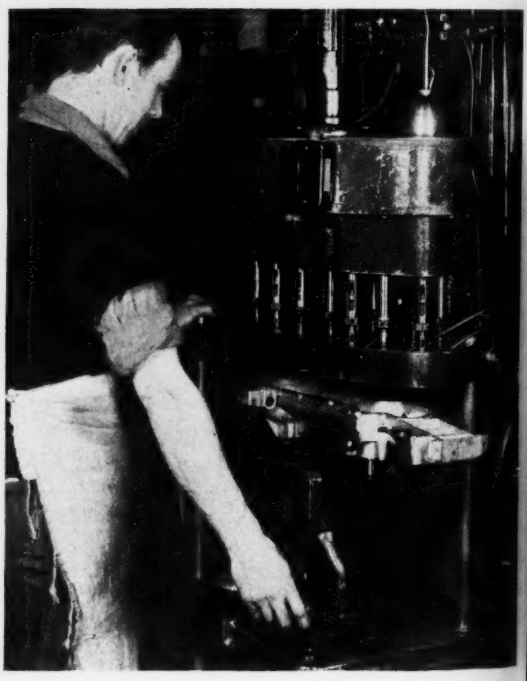
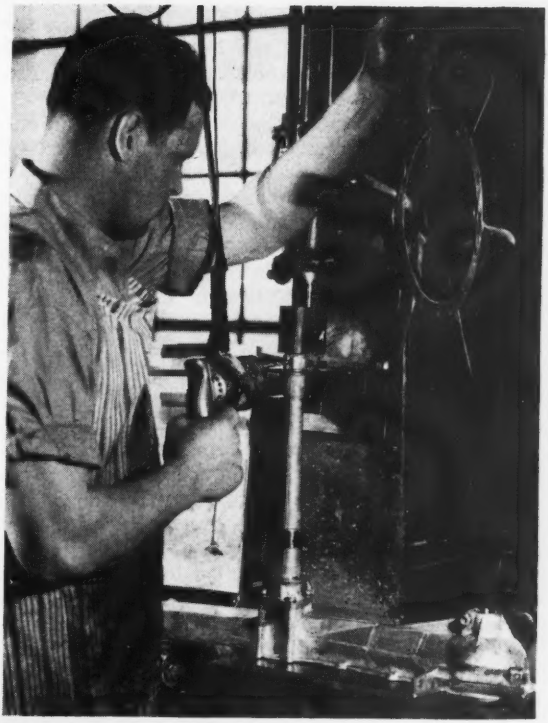


Fig. 5—A Single Spindle Drill, Equipped with a Multiple Spindle Head, Makes Possible the Tapping of 13 Holes Simultaneously in the Gear Case

Fig. 7—A Shim Between the Nut and the End of the Housing Ensures Proper Clearance at all Temperatures



To operate, the case is located on two locating plugs on the holding fixture, the plugs entering shaft holes that have been reamed to size. The table is now raised to a stop which brings the work to a predetermined distance from the taps. The head carrying the taps is fed downward, and when the taps have reached the proper depth, they reverse and the head rises again at a speed which synchronizes with the thread of the taps.

In Fig. 6 an operator is shown pressing the bearings into a crankcase, making use of a pneumatic press for this operation. The ram carries a cylindrical pressing tool of the correct diameter to fit the hole in the bearing, with a shoulder which bears against the end of the bushing

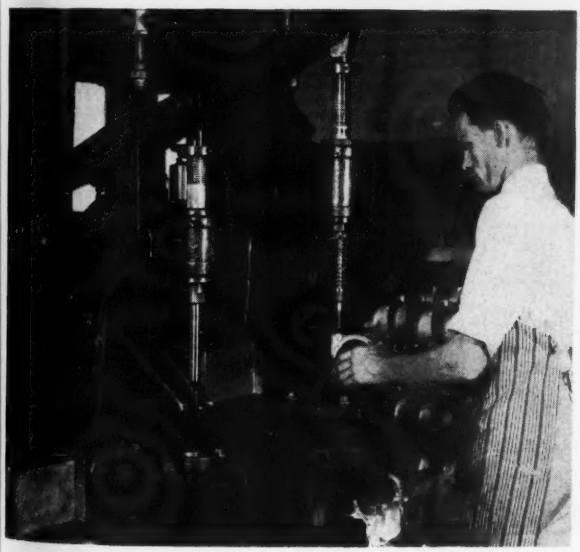


Fig. 6—Pressing Bearings into a Washing Machine Crankcase with the Aid of an Air-operated Press

and forces the bushing in as the force of the air is applied. For another hole in the case, which requires a bushing of a different inside and outside diameter, the air press at the left of the operator is used. The two presses are close enough together so that the operation of pressing-in one bushing can be followed by the other one immediately.

In assembling the agitator nut to the agitator shaft, as shown in Fig. 7, clearance of exactly 0.015 in. must be left between the nut and the end of the housing so that the nut will not bind with changes in temperature. The 0.015 in. allowed is sufficient so that maximum clearance will be provided when the mechanism is cold and minimum clearance when it is hot. To maintain this clearance, a hole is drilled through the wall of the nut and into the shaft for a lockscrew, and in order to make sure that the correct allowance of 0.015 in. is obtained, the nut is pressed down against a 0.015 in. shim, as shown in the illustration. After tightening the locating screw, removal of the part from the fixture with its shim leaves the shim properly positioned for assembly of the next agitator nut.

An excellent example of modern efficiency in assembling is illustrated in the set-up of work-holding fixtures, equipment, and materials shown in Fig. 8, where an operator can be seen at work on the task of assembling the agitator control mechanism. A double work-fixture is used, making it possible to work on two units at a time and still have all necessary materials and tools within each reach.

The fixtures are designed to hold the units in the correct position for assembling, thus leaving the operator's hands free to apply the small parts and manipulate the tools. Arranged in a semi-circle around the rear of the fixture is a row of six steel bins from which the operator draws the nuts, washers, and small parts used in the assembly. The materials are put in at the top of the bins and are removed from an apron upon which they fall at the bottom. The aprons are all the same height from the bench, which is an aid in eliminating lost motion.

With the parts assembled and a

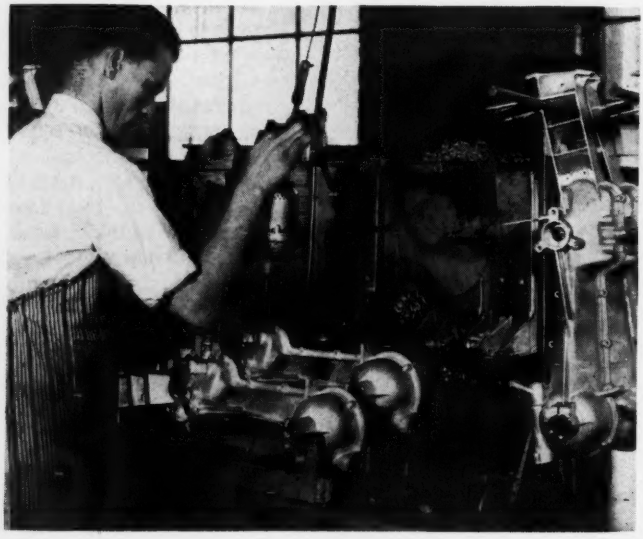


Fig. 8—An Excellent Example of Stock, Tool, and Work Arrangement for Efficiency on a Hand Operation

The productive capacity of a milling machine depends more upon its rigidity than on any one other factor. Rigidity originates in the column — the backbone of the machine. Examine the column of a Milwaukee Milling Machine and you will see that it has been carefully engineered for the proper distribution of metal. An inside horizontal wall divides it into a double box section; the cross mounting of the motor permits a solid rear wall, which together with the solid front face, assures an unusually rigid structure.

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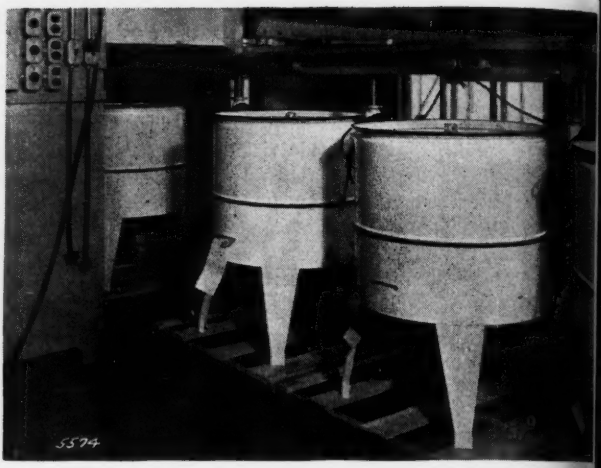


Fig. 9—G. E. Washing Machines in the "Noise" Room for Complete Check-Up under Operating Conditions

screw held in position by hand, the nut is threaded on and tightened down by the use of the Hy-Cycle nut setter shown suspended above the work-fixture. The nut setter is balanced so that it can easily be pulled down and as easily raised to a position out of the way when not in actual use. With such an arrangement of parts and tools, an operator easily develops the ability to reach for parts and tools without having to follow his hand with his eyes, thus enabling him to reach maximum efficiency. This illustration is typical of the care that has been used in setting up the entire assembly line.

Figure 9 shows a line of washers on the mechanical conveyor in the "noise" room where they are adjusted to prevent any undue amount of noise in operation. In addition to determining the noise level characteristics the electrical characteristics of the motor are observed at the same time as a guide to the proper mechanical adjustment of the mechanism. The motor characteristics are observed on meters in the noise room similar to those meters which may be seen on the wall of the illustration. Each complete machine is individually inspected and a record made of its operation and efficiency under conditions which duplicate actual consumer use. Upon satisfactory completion of these tests, the machine is finally inspected for "finish" and appearance. The machines are then ready for packing and shipment to the four corners of the world.

"Steel for the Ages"—Motion Picture

The Allegheny Ludlum Steel Corporation has just completed production of a film titled "Steel for the Ages," the final screening and release of which has been approved by Mr. H. G. Batcheller, president of Allegheny Ludlum Steel Corporation, Pittsburgh, Pennsylvania.

This color and sound motion picture deals with the manufacturing of stainless steel from the melting furnace to the finished products, such as sheets, strip, bars, wire, tubes, and so on. Many shots of tapping, teeming, cogging, rolling and drawing stainless steel, make it the most interesting picture ever released by this concern.

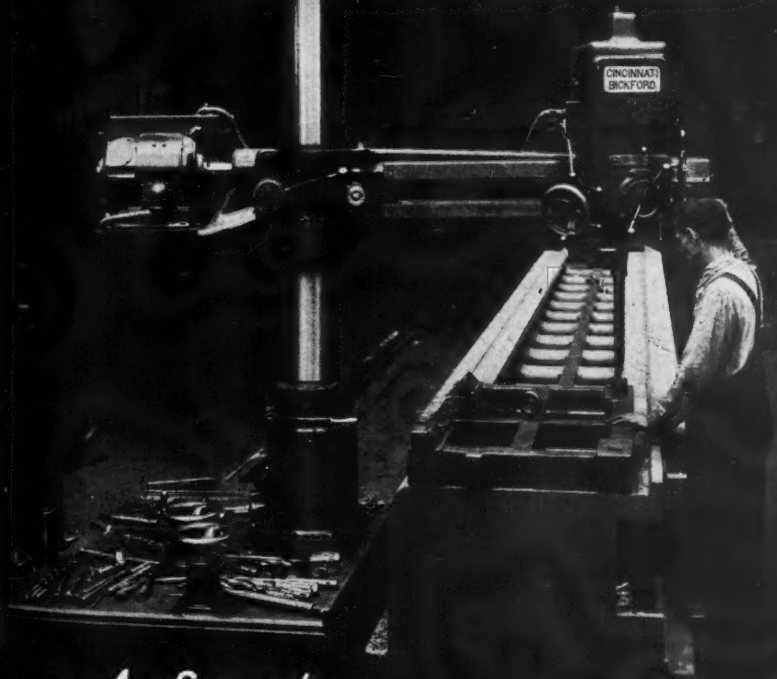
Included in this picture are views at several different mills, such as sheet manufacturing at the Brackenridge plant, wire and bar manufacturing at the Dunkirk, New York, plant, and the modern cold strip mill at Wallingford, Connecticut.

The Allegheny Ludlum Steel Corporation invites interested groups to contact the Corporation at 2319 Oliver Bldg., Pittsburgh, Pa., for information about bookings.

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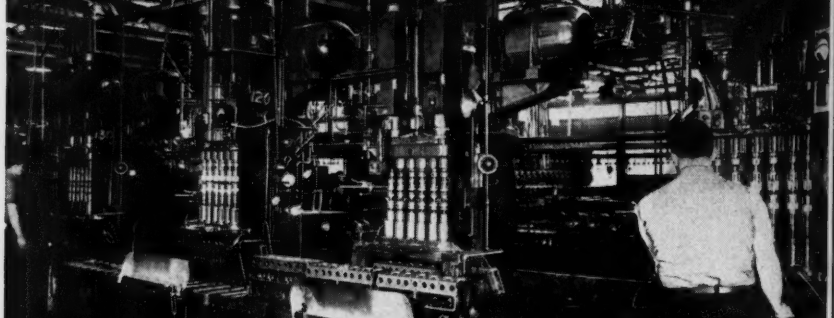
Microfinish---What It

. . . . By . . . .
LAWRENCE S. MARTZ
Advertising Manager,
Micromatic Hone Corporation

THE manufacturers of automobile engines and of auxiliary automotive parts in the United States have established greater high production requirements for uniform mechanical processing than in any other country. As a result, intensive development of tools and machines has been pioneered by automotive manufacturing usage, to the extent that all other industry has benefited in this progress.

As an indication of the value of the honing process in automotive manufacture, a recent survey shows that, of approximately 50 operating or bearing assemblies in the average motor car, a total of 40 represent honing applications now used by American manufacturers to produce final surface finish of from 1 to 10 microinches. All of these manufacturers use honing for the final processing of cylinder bores. In 1937 approximately one-half of the total production of cylinder blocks was processed with one honing operation, and the balance with two honing operations. Approximately 70 per cent of all blocks processed was finished with varying degrees of fine honed Microfinish.

Fig. 14—Battery of Four Honing Machines in Cylinder Production Line in Automobile Motor Plant



...nd How It Is Used, III

Typical Applications of Microfinish to a Wide Variety of Parts

The view Fig. 14 is typical of many of these cylinder bore processing installations, comprising the latest developments in honing tool equipment. This view represents a battery of four honing machines, two being used for rough honing and two for finish honing operations. Counting from the right hand side of the picture, the first and third machines, which are used for rough housing, are equipped with hydraulically-actuated honing tools and that the finishing machines, Nos. 2 and 4, are equipped with automatic, mechanically-actuated finishing tools.

Typical of these installations, production is maintained, according to production requirements, at from 35 to 100 blocks per hour per machine, removing from 0.003 to 0.0035 in. stock following reaming, or 0.0015 to 0.005 in. for roundness and straightness, with finish varying from as low as 2.8 microinches to as high as 8 microinches, according to the optional selection of the manufacturer.

Figure 15 illustrates the tools and fixtures commonly used on connecting rod honing applications. Earlier attempts to hone several pieces at a time were unsuccessful, principally because of the difficulty experienced in keeping the bores centered and the faces of the rods parallel when the pieces were clamped rigidly together.

Any slight deviation from squareness in the side faces of the work presented an accumulated error that threw the bores out of parallel, or out of alignment. This necessitated removal of a large amount of stock to clean them up, in which operation,

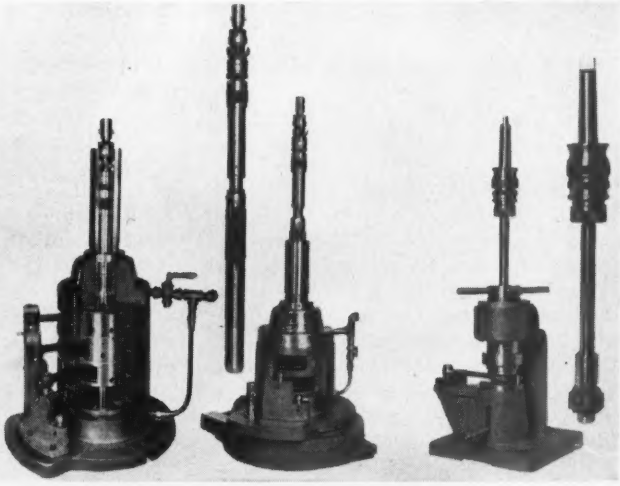


Fig. 15—Typical Set of Tools and Fixtures Used for Honing Connecting Rods

the final diameter could not be controlled. It was also found difficult to clamp small parts of light section sufficiently tight for any machining process without producing excessive distortion when attempting to main-

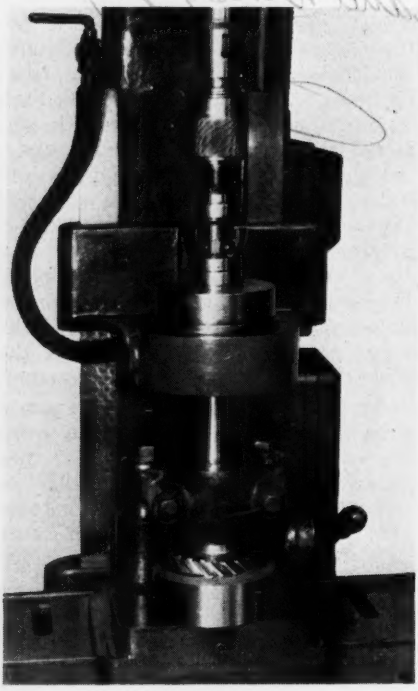


Fig. 16—Honing Tool and Fixture for Microfinishing the Bore of a Transmission Gear, with the Workpiece in Position

tain limits of accuracy within 0.0005 inch.

To design around these earlier difficulties and to meet the requirements of multiple piece honing in high production required the development of new methods especially adapted to this work. The final result is incorporated in the equipment here shown, and consists fundamentally in providing for the work to float.

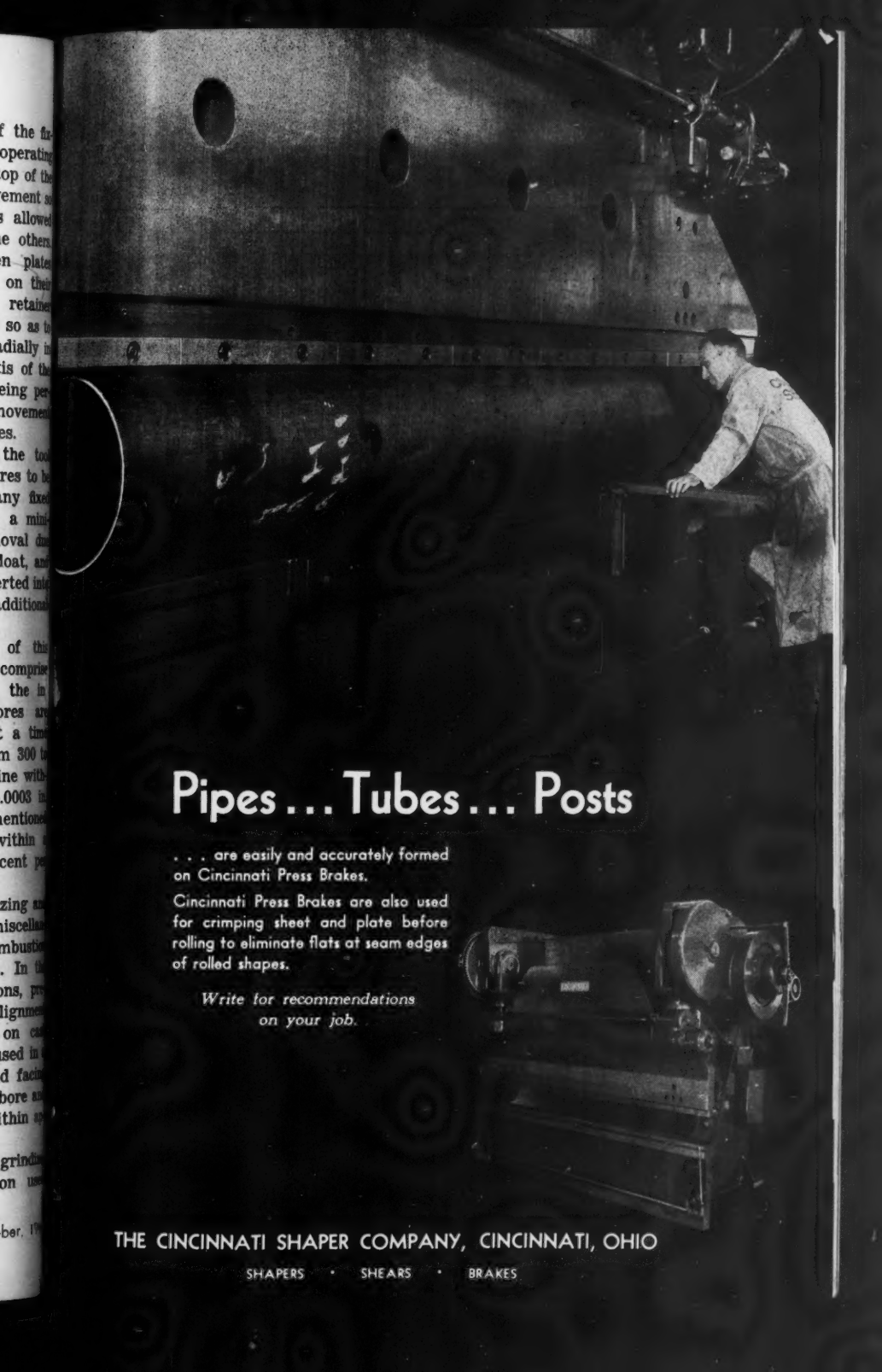
The tool is piloted in an integral bushing in the lower end of the fixture and in a combination operating and guiding bushing in the top of the fixture, with suitable arrangement so that each connecting rod is allowed to float independently of the others. The rods are held between plates which have spherical faces on their edges to contact with the retainer assembly, and are arranged so as to permit each rod to float radially in any direction around the axis of the crankpin hole, as well as being permitted to have a lateral movement by sliding between the plates.

With this arrangement, the tool automatically centers the bores to be honed without regard to any fixed locating point, accomplishes a minimum amount of stock removal due to the work being free to float, and allows the work to be re-inserted into the fixture and re-honed if additional stock removal is necessary.

In various installations of this equipment, some of which comprise the largest productions in the industry, these crankpin bores are honed at a rate of four at a time with production ranging from 300 to 350 rods per hour per machine within accuracy of 0.0002 to 0.0003 in. following any of the above-mentioned previous operations, and within a cost of less than one-half cent per rod.

Honing is used for final sizing and finish in a large variety of miscellaneous parts in the internal combustion engine and other industries. In the majority of these applications, precision boring is the final alignment generating operation used on cast iron parts. It is frequently used in a combined cylinder boring and facing operation in which both the bore and the face run-out are held within approximately 0.0002 in. limits.

Similarly, on steel parts, grinding is usually the last operation used


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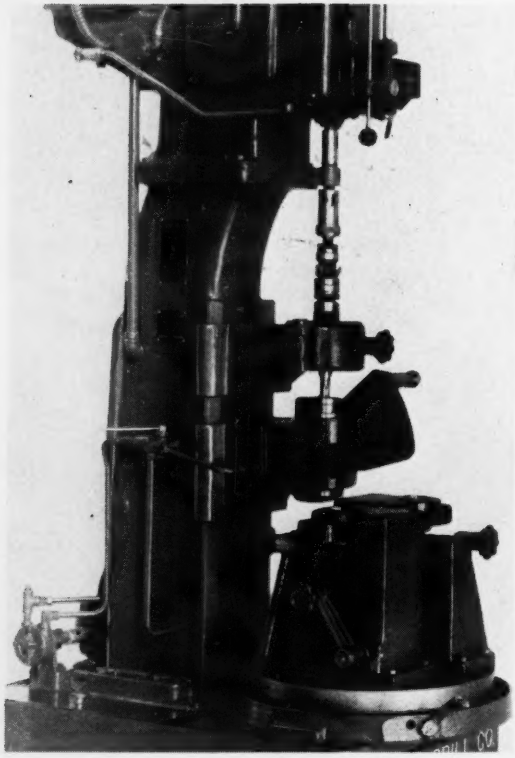


Fig. 17 — Typical Setup of Equipment for the Finishing of an Electric Refrigerator Compressor

prior to honing, with accuracy for roundness and straightness of the bore being held within approximately 0.0002 to 0.0003 in. The second speed transmission gear shown in Fig. 16 is honed in a single operation, following grinding. From 0.001 to 0.0015 in. of stock is removed, and accuracy within 0.0002 to 0.0003 in. is maintained uniformly.

The equipment shown in Fig. 17 is typical of installations for the finishing of refrigerator compressor cylinders and similar parts. In the majority of these applications from 0.001 to 0.0015 in. of stock is removed in one or two honing operations, following precision boring, within accuracy of 0.0001 to 0.00015 in. for roundness and straightness at the rate of 100 to 125 bores per hour when using a two-station rotating hand indexing fixture as here illustrated.

In addition, refrigerator rollators are being finish honed in a single honing operation, from 0.001 to 0.0005 in. of stock being removed following grinding, producing accuracy in some applications as fine as 0.0005 in. for roundness and straightness and surface finish of from 1 to 2.5 microinches.

The combined engineering and manufacturing advantages of the hone abrading process are extensively used in industrial transportation and power units such as truck, tractor, bus, railroad, marine and stationary engines as well as industrial pumps and compressors. In this field, honing is used in the final processing of practically all cast-iron block bores and for replaceable cylinder sleeve liners.

The equipment shown in Fig. 18 is typical of the latest development and trend toward all-hydraulic actuation in the honing process. As here shown, the machine is equipped with an automatic hydraulically-actuated honing tool, used in connection with the two-station indexing fixture for honing bores 5¾-in. diameter x 15 in. long, and comprising an important accomplishment in simplified processing. In former practice, these sleeves

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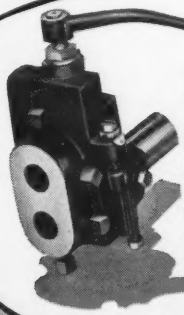
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A new Warner & Swasey Slide Tool made an immediate 50% time saving in grooving work at the Reeves Pulley Co., Columbus, Indiana. The work is on various types and sizes of cast iron bearing housings ranging in lots of 50 to 300 pieces. Typical examples of this work are detailed below. With the new slide tool the operator cuts grooves with less than a quarter turn of the handle, where five or six turns were required with the old style slide tool. The rigidity and smooth action of the tool allows faster feeds and produces a higher quality finish on each part.

If you have grooving operations, a new Warner & Swasey Quick Acting Slide Tool will cut your machinery time. You will find complete information on this tool on page 39 of your new Warner & Swasey Turret Lathe Tool Catalog. For prices on this tool, or further information, write



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Universal Screws made from nickle steel and cadmium plated, are now available in boxes of 100 and may be ordered for your stock room. Universal Drill Bushings are superfinished to insure accuracy and unexcelled wearing qualities. Made to A.S.A. Standards, available in all standard sizes.

UNIVERSAL
Engineering Company
Frankenmuth, Mich.

were processed as follows:

Rough bore, harden to 45-50 Rockwell C scale, rebore, rough hone, and finish hone with mechanically actuated honing tools — a total of four operations. Approximately 0.005 in. of stock on the diameter was removed in the combined honing processes, at the rate of 0.001 in. per minute.

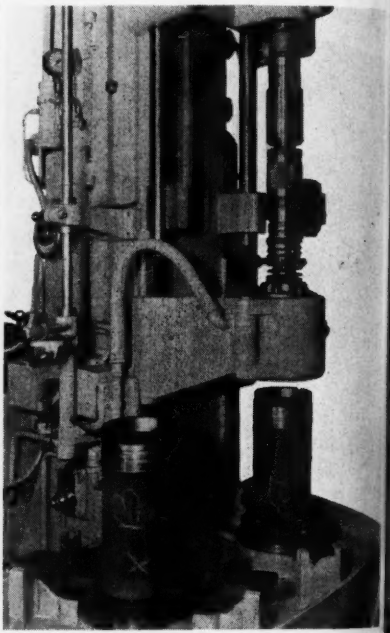


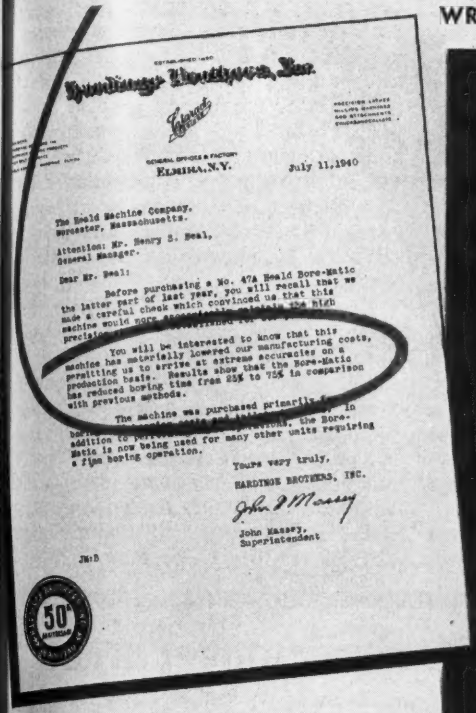
Fig. 18—Honing Machine Equipped with an Automatic Hydraulically-Actuated Honing Tool, used in Connection with Two-Station Indexing Fixture for Honing Sleeves

With the use of hydraulic honing tools, it was found possible to reduce this processing to three operations, as follows:

Rough bore, removing about 0.250 in. of stock, then heat treat to 45-50 Rockwell C scale, which may produce out-of-roundness varying from 0.008 to 0.018 in. Hydraulic honing tools then remove an aver-

ore-Matic reduces Boring Time 25% to 75%"

WRITE HARDINGE BROTHERS, Inc.



Hardinge Brothers, Inc.

GENERAL OFFICES & FACTORY
ELMIRA, N.Y. July 11,1940

The Heald Machine Company,
Worcester, Massachusetts.

Attention: Mr. Henry S. Neal,
General Manager.

Dear Mr. Neal:

Before purchasing a No. 47A Heald Bore-Matic the latter part of last year, you will recall that we made a careful check which convinced us that this machine would [illegible] the high precision [illegible]

You will be interested to know that this machine has materially lowered our manufacturing costs, permitting us to arrive at extreme accuracies on a production basis. Results show that the Bore-Matic has reduced boring time from 25% to 75% in comparison with previous methods.

The machine was purchased primarily for [illegible] In addition to [illegible] the Bore-Matic is now being used for many other units requiring a fine boring operation.

Yours very truly,
HARDINGE BROTHERS, INC.
John Massey
John Massey,
Superintendent

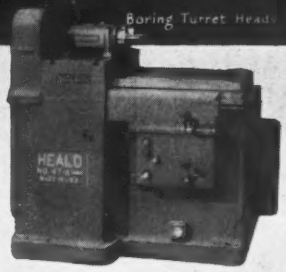
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50th ANNIVERSARY



AINTAINS EXTREME ACCURACY ON PRODUCTION BASIS"

Extreme accuracy on a production basis is now obtained with a Heald Matic" write Hardinge Brothers, Inc., manufacturers of fine machine Their Bore-Matic, they add, has materially lowered manufacturing savings ranging up to 75%. This Bore-Matic is used to precision bore ock bearing seats, tailstock bores, turret heads, as well as many other Results are characterized by very close and uniform accuracy for size, ess and straightness, essential requirements to meet exacting Hardinge rds but only obtained by previous methods with considerable care and e. Such results are by no means unusual. Many other manufacturers stalled Bore-Matics with equal success. Their experience has conclusively that precision can be produced economically with Heald Bore-Matics.



Borize and Save with BORE-MATICS

The HEALD Machine Company

WORCESTER, MASSACHUSETTS, U. S. A.

age of 0.022 in. of stock in a rough honing operation at the rate of 0.010 to 0.012 in. per minute, correcting all distortion and controlling approximate final diameter size. This is followed by a secondary finish honing operation, removing 0.001 in. of stock for securing final diameter size and surface finish. This combined processing produces accuracy within 0.0005 in. for roundness and from 0.0007 to 0.001 in. for straightness. Final surface finish is 2.6 microinches, profilometer reading. The O.D. is then generated from the I.D. Total production is maintained at the rate of approximately 20 sleeves per hour, and approximately 70 sleeves per set of honing stones are obtained.

The combined processing and final finishing of tubing length bores represents a difficult problem. Included in this category has been the manufacture of ordnance, comprising recoil mechanism cylinders such as recuperator and buffer cylinder, anti-aircraft gun barrels, small rifle bores, large caliber gun liners, and large caliber gun casings.

Materials commonly used in these parts include soft steel, monel metal, and hardened steel forgings. The work varies in diameter from small arms rifle calibers of 0.500 in. to large gun bores of 30-in. diameter and from 1 or 3 ft. to approximately 75 ft. in length.

Recoil mechanism cylinders for lower caliber artillery may, for example, be 2¾-in. diameter x 60 to 70 in. long and may be either of monel metal or forged steel. Many of these parts are reamed within accuracy of 0.0005 in. Previous to the adoption of straight line honing tools employing bonded abrasive sticks, these bores were lapped with long lapping plugs or finished by a specially developed

Johnson 550 Pot-Hardening Furnace



Reduces Operating Costs for Salt, Cyanide and Lead-Hardening, and Heat-Treating.

Furnished with lid, derrick for lifting lid, steel pot (8" dia. x 10" deep), and Johnson Blower. This model saves heating a large furnace for a few small parts, and is especially convenient for use in small shops. Widely used by tool and die makers, by small plants for case-hardening, and by pattern and model makers for melting small quantities of aluminum, brass and nickel-silver. Temperature easily regulated, and gas consumption is low. Priced at $112.00 F.O.B. Cedar Rapids. With No. 20 Crucible (capacity 20 lbs. aluminum, 65 lbs. brass) instead of Steel Pot, $99.50. Also available in larger sizes. Send us your specifications for quotations.

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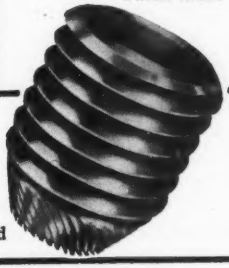
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Unique knurled heads—found only on "Unbrako" Caps — insure a non-slip grip for workman's fingers or pliers. Preferred by mechanics, designers and buyers, this feature alone saves plenty of assembly time . . . makes a neater finished appearance.

HOLLOW SET SCREWS

Ingenious knurled points automatically lock these screws into place . . . hold them against all vibration with no more than ordinary pressure. "Unbrako" Self-Lockers, therefore, are easy to adjust or remove, and they can be used over again indefinitely.

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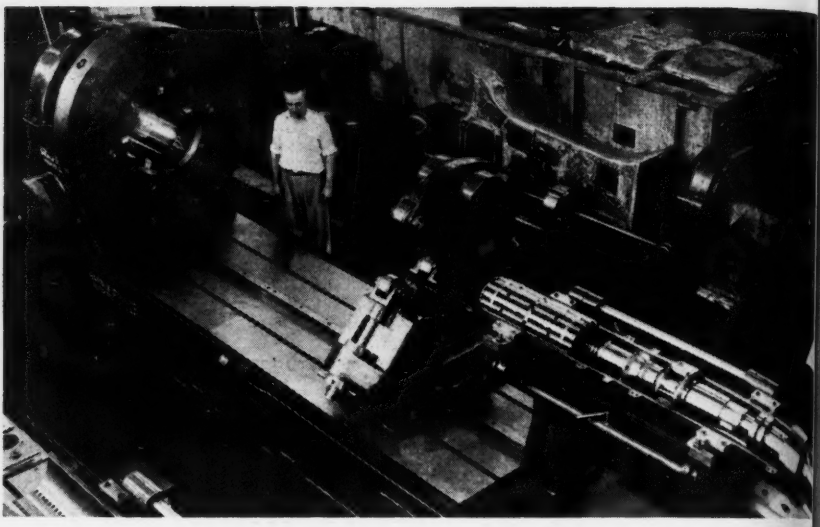


Fig. 19—Horizontal Honing Machine Designed for the Honing of the Bores of Huge Naval and Coast Defense Guns

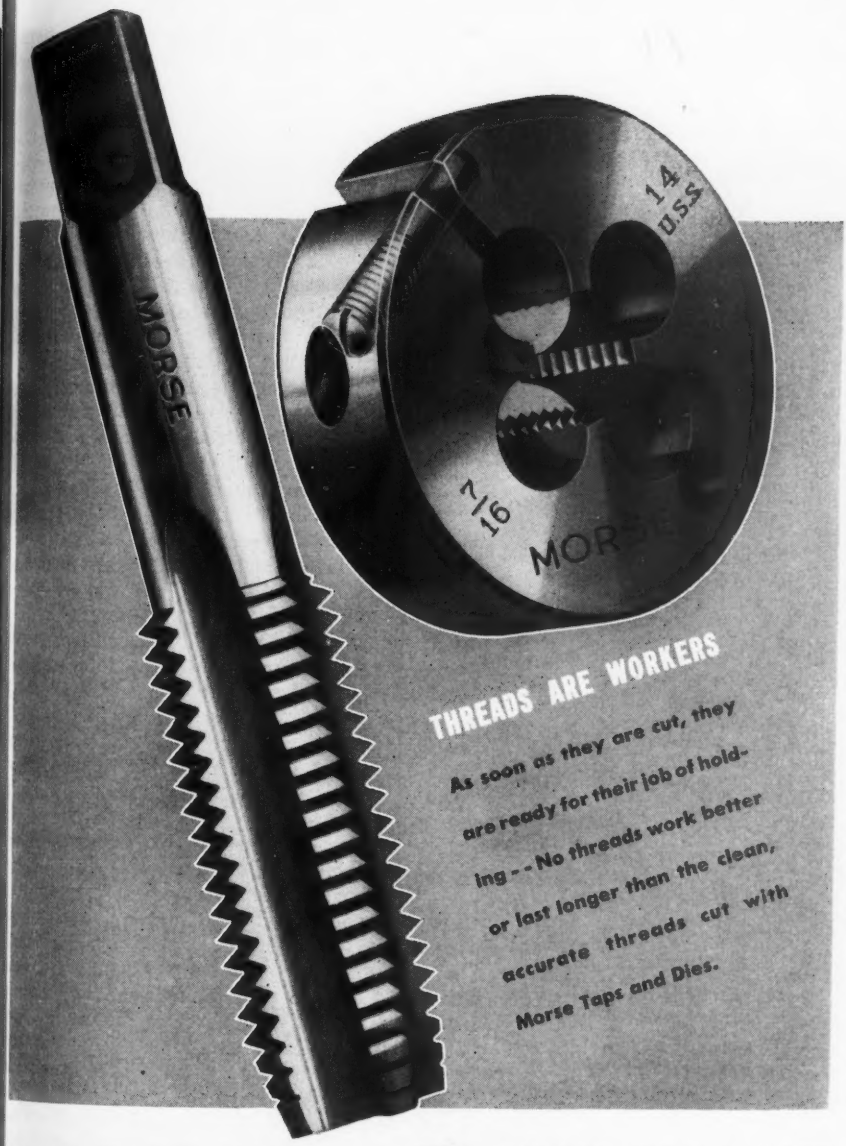
machine which employs an endless belt of abrasive paper traveling longitudinally through the bore.

A number of gun factories are now using the honing process following pack reaming. A rough honing operation is used to remove stock for approximate diameter size, followed by a finishing operation for final diameter sizing and accuracy. These are then followed by a third straight line honing operation, using an adapted form of honing tool which is fitted with special wide or interlocked stones. This tool is drawn lengthwise through the finish honed bore. In typical applications on monel metal cylinders 0.004 in. total stock can be removed in approximately five minutes for rough honing, and 0.001 in. of stock in five minutes in finishing with straight line honing tools.

In the finishing of forged steel cylinders, approximately 0.010 in. of stock is removed in two honing operations in 30 minutes, the piece being finished by straight line honing in 2 to 30 minutes. Accuracy is conventionally held within 0.0005 to 0.00 in. for out-of-round and total taper Final surface finish marks parall with the axis of the bore are approx mately 1 to 3 microinches or les profilometer reading, and around th diameter or across the straight lin honing marks, from 5 to 7 micro inches.

Stone cost for approximately 0.00 in. stock removal on diameter fo rough honing and a bore of the sam size is approximately seven-hun dredths of one cent per cubic inch o stock removal or six-tenth of one cen per lineal inch. For finish honing, th stone cast is approximately two hun dredths of a cent per cubic inch o one-tenth of a cent per lineal inch fo 0.001 inch total stock removal o diameter.

The generation of gun bores fro solid steel forgings is a slow an costly process requiring maximu



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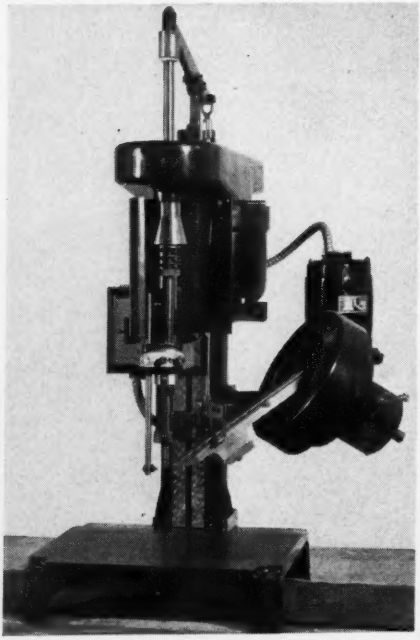
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A STURDY—EFFICIENT—PRACTICALLY DESIGNED MACHINE.



Eliminates the troublesome handling of small screws.

Screws always in sight of operator.

Sensitive, easily adjusted spindle clutch to meet all requirements of screw tension.

Table designed for conveniently operating machine over conveyor belt.

Write for circular.

SEND SAMPLE ASSEMBLIES FOR PRODUCTION ESTIMATES.

DETROIT POWER SCREWDRIVER CO.
5375 Rohns Avenue Detroit, Michigan

maintenance of tools and exceptional care in the various trephinning, boring, and pack reaming operations involved. It is reported that with a feed of 6 to 12 in. per hour for a finish boring operation in a bore 4½ in. diameter x 17 ft. long, approximately 20 to 30 hours of operating time per cut is required.

The honing process has made possible an improvement in the finishing of gun bores. Installations have been made in which it has been demonstrated that honing can follow a semi-finish boring operation, removing considerable stock in a small fraction of the time required to generate a cylinder bore.

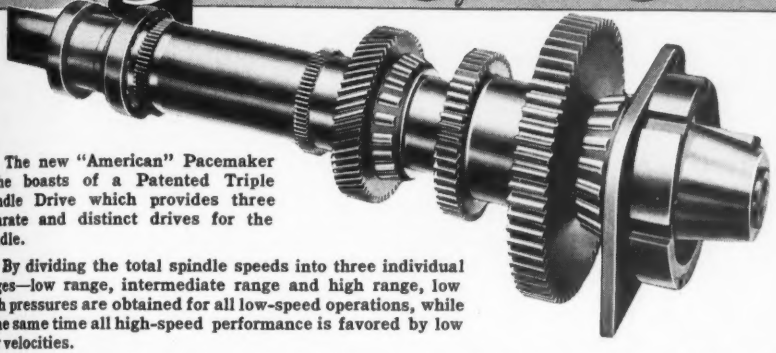
This method of final processing has been responsible for a startling degree of accomplishment in recent installations. A recent test, involving the reconditioning of a worn bore was made on a gun approximately 16 ft. long with a muzzle diameter of 4.457 in. and breech diameter of 4.47 in., amounting to approximately 0.0 in. total taper and an estimated 0.0 in. out-of-round and the barrel contained numerous hard spots caused by intermittent heating and cooling in service.

Approximately two weeks were required for reboring, during which time three cutter bars were twisted and broken. The resulting rebore was indeed a very rough job with a number of score marks resulting from the boring operation. This bore was honed to 4.500-in. diameter by rough honing with mechanically-actuated tools in two and one-half hours time and within accuracy of 0.0005 in., as measured every 10 in. throughout the length of the bore.

Following this inspection, approximately 0.0005 to 0.0007 in. of stock was removed by finish honing in minutes time, the final surface finish gaging within 5 microinches.

SOMETHING NEW IN LATHE DESIGN . . .

3 SEPARATE AND DISTINCT *Spindle Drives*



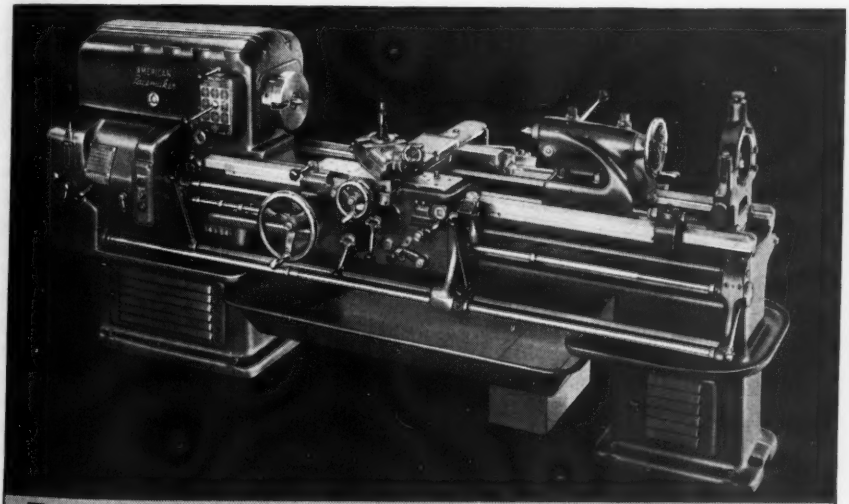
The new "American" Pacemaker Lathe boasts of a Patented Triple Spindle Drive which provides three separate and distinct drives for the spindle.

By dividing the total spindle speeds into three individual ranges—low range, intermediate range and high range, low tooth pressures are obtained for all low-speed operations, while at the same time all high-speed performance is favored by low gear velocities.

This is an ideal type of transmission for it insures long and effective life by minimizing tooth wear and smooth and quiet operation due to the low velocities.

The "American" Pacemaker has unquestionably stepped out in front on spindle design which is one of the major contributions to its excellent functioning on all classes of lathe service.

You should have Bulletin No. 15, which tells the complete story.



THE AMERICAN TOOL WORKS COMPANY

Lathes • Radials • Shapers

CINCINNATI, OHIO, U. S. A.

method of processing has now replaced the previous method of lapping following finish boring which was used in a number of arsenals and which required, for the lapping alone, up to one and one-half weeks time.

In another recent test, hydraulically-actuated honing tools were used to meet a more severe condition resulting from the type of metal used in the forging. The metal in this gun had been cold worked, which presented additional machining difficulties. In this test, on a bore 6-in. diameter x 258 in. long, a rough honing operation was used, following semi-finish boring which removed a total of 0.100 in. of stock on the diameter at a rate of 0.012 to 0.014 in. per hour. Stone wear for this amount of stock removal was computed at one-half cent per cubic inch, or 12.4 cents per lineal foot.

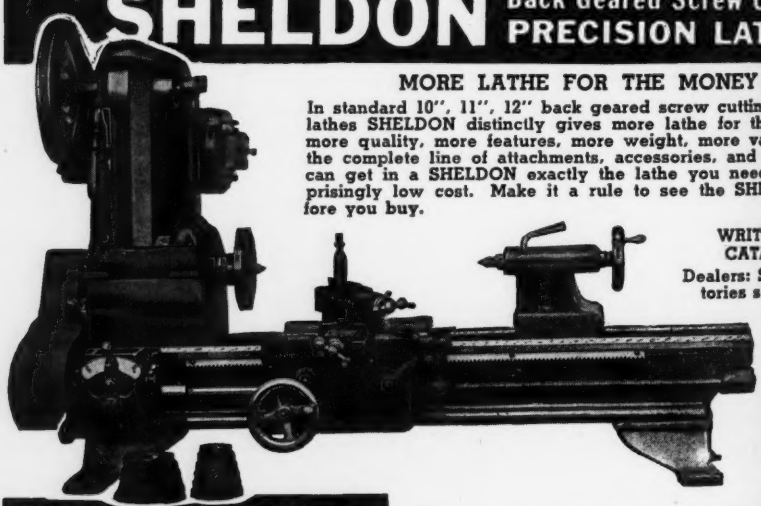
This bore was honed with final accuracy of 0.0005 in. for roundness and taper, measured each inch throughout the length of the bore with both star and electric gages. This test demonstrated the advantage of the honing process over the slow and costly finish boring operation. Considering that it is not at all unusual for one of these forgings —which in the finish state may cost approximately $200,000—to be scrapped in finish boring, the features of control and safety provided by the honing process for final finish processing offer incomparable advantages.

In the aircraft industry, where the power-weight ratio is extremely high, engineering design must provide the maximum safety insurance against undue wearing and fatigue of thin wall sections. It is an interesting fact that the trend in this field has constantly been toward harder metals and the closest obtainable limits of accuracy, size, and surface finish.

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MORE LATHE FOR THE MONEY!

In standard 10", 11", 12" back geared screw cutting precision lathes SHELDON distinctly gives more lathe for the money—more quality, more features, more weight, more value. From the complete line of attachments, accessories, and drives you can get in a SHELDON exactly the lathe you need at a surprisingly low cost. Make it a rule to see the SHELDON before you buy.



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• It's a new engineering approach to judge metal cutting cost by the shape of the chip—but that's what the Atkins Curled Chip System has contributed to industry in this year of increasing demands on every production tool. Broken metal, gilding in the bottom of the cut, is a prime cause of friction drag on saw teeth. It drops out in piles like filings and, since the development of the Atkins Curled Chip, is a symbol of waste.

By new tooth-and-gullet design the metal is cut cleanly by Atkins Curled Chip Saws and *coiled up* behind each tooth ready to spring out of its own tension at the moment of release.

Write us, or ask your Atkins jobber, for facts on this new way to low metal cutting costs. If you want heavier feeds remember the gullet that has great capacity to hold big chips completely. If the need is speed the same gullet voids *more metal faster.*

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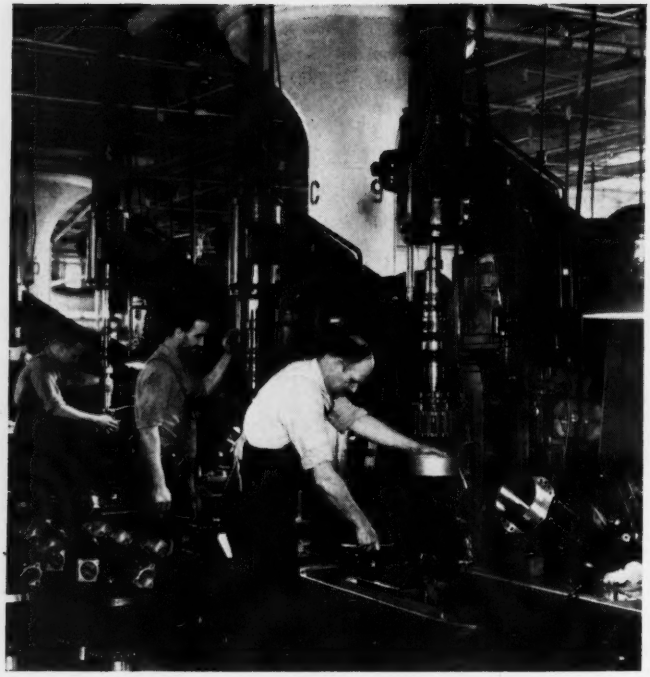


Fig. 20 — Battery of Honing Machines at Work on Cylinders for Radial-Type Airplane Engines

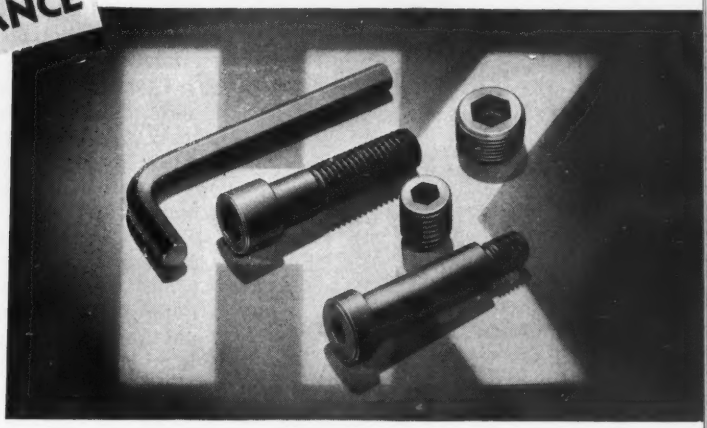
One leading manufacturer of aircraft engines has finish honed radial-type engine barrels regularly in production since 1933. Many other manufacturers have since adopted this operation. In the average installation, approximately 0.001 to 0.0015 in. of stock is removed from a ground finish in nitrided or soft steel in one operation, using 400 or 500 grit stones. Limits for accuracy in the 6⅛-in. diameter bore, for instance, are within 0.0003 to 0.0005 in. for roundness and straightness, and surface finish smoothness is within 1.8 to 2.5 microinches. The illustration Fig. 20 shows a battery of honing machines at work on cylinders for radial-type airplane engines.

The recent announcement by a leading manufacturer of grinding machines that all future production would be designed and made for kerosene lubricated spindle bearings sharply focused attention on the accuracies and finishes required on shaft and bearing surfaces required. Accuracy reported is held to 0.0001 in. for roundness and straightness, and ground surface finish of 1 to 2 microinches, r.m.s., is said to be maintained in production. It would seem to be significant that, in support of a claim for production of increased accuracy, finish and production, tests show kerosense temperature does not rise above 100 deg. F., whereas lubricating oil temperatures formerly used were approximately 140 deg. F. This improved efficiency is believed due to a corresponding decrease in repetitive expansion and contraction of the machine components.

Honing has been used on both single and tandem-type bores in headstocks for radial drills, lathes, turret lathes and grinding machines for several years. Typical of the results obtained is the removal of approximately 0.002 in. in precision-bored, and up to 0.005 to 0.007 in. in plain-bored cast iron parts such as those shown in Fig. 21. Various manufac-

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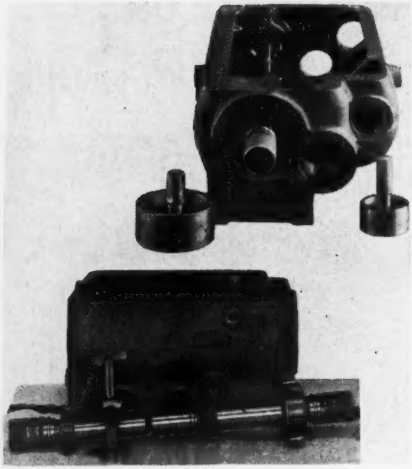


Fig. 21—Honing Has Been Used for Several Years on Bores in Headstocks for Lathes and Other Machine Tools. Here are a Couple of Typical Headstocks with the Honing Tool and Gages Used in Finishing the Bearing Fits

turers have recently begun honing tailstock bearings.

In typical installations for these parts, special tandem tools of the semi-automatic type shown in Fig. 22 are used. It will be noted that they are arranged with separate adjustment for each body member. They are unusually effective in finishing tandem bearing bores which are of approximately the same diameter and length. In case of widely different diameter and length combinations, it has been found effective to use one hone body as a pilot in its bore while honing the other bore. This is done by using replaceable inserts in the stone holders, or by wrapping the particular tool body being used as a pilot.

A large number of machine tool manufacturers are honing cast iron and nitrided steel spindle sleeves, quills, bearings, cast iron and steel hydraulic cylinders and tubes, pump bodies, and valve panels. Due to low production requirements, many manufacturers have converted various kinds of machine tools for use in honing. Consequently, unit costs, production and accomplishment data must necessarily be so completely individualized as to offer little comparison with other standard machine methods. In practically every case where honing has been adopted for machine tool manufacture, it has brought quality improvement in the work produced for any or all of the improvements provided.

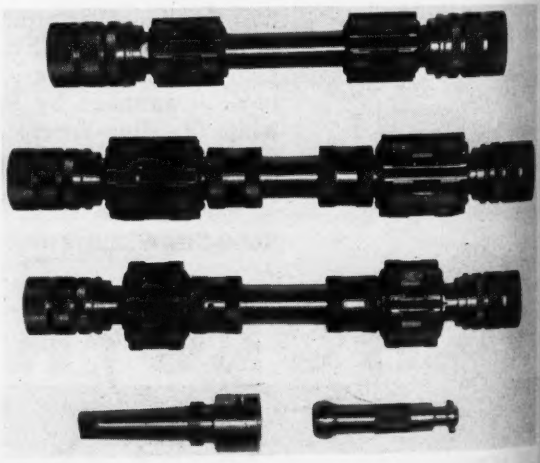


Fig. 22 — Tandem Honing Tools of the Semi-Automatic Type Used in Finishing Headstock and Tailstock Bearing Fits

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FIFTY years of Precision . . . from the filing or polishing head, through watchmakers' precision tools and lathes to the modern, favorably known Hardinge High Speed Precision Machines.

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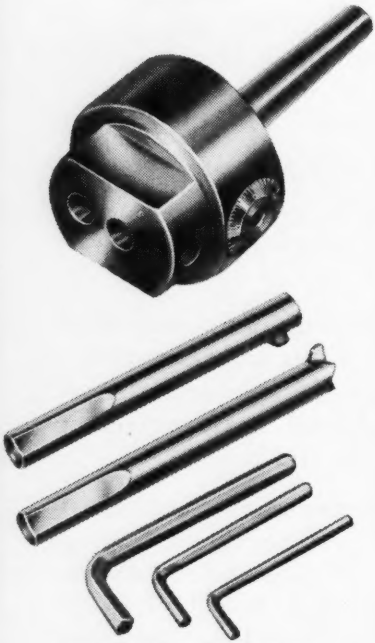
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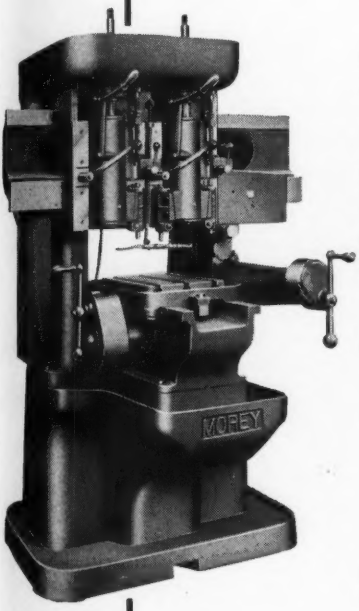
Safety Centerless Grinding Wheels are the subject of a four-page illustrated bulletin which is now being distributed by The Safety Grinding Wheel & Machine Co., P. O. Box 746, Springfield, Ohio. Copy of Bulletin W-236 free.

West Bend "Weld-Bilt" Portable Hand-Operated and Electric Elevators, products of the West Bend Equipment Corp., West Bend, Wis., are profusely illustrated and described in a 16-page bulletin, designated as No. 540-A, which has been prepared by this firm. Among the "Weld-Bilt" products covered are: hand-operated portable hydraulic die lifters, hand-operated hinged and non-hinged type portable elevators, hand-operated single and double telescopic portable elevators, hinged electric portable elevators, electric floor-to-floor and sidewalk type elevators, and others. Also included are several illustrations showing various installations of the "Weld-Bilt" elevators. Copy of Bulletin No. 540-A free upon request.

NEW

High Speed Vertical Profiler and Milling Machine

Motor Driven



Designed for accurate, low cost production of small interchangeable parts.

Standard machine has two spindles but single spindle can be furnished. Spindles are driven independently by vertical motors through a four-step V-belt drive.

Working surface of table is 12¾" x 15¼" and longitudinal table travel is 23".

Distance from table top to spindle end, minimum 4"; maximum, 12".

Distance between uprights, 18½".

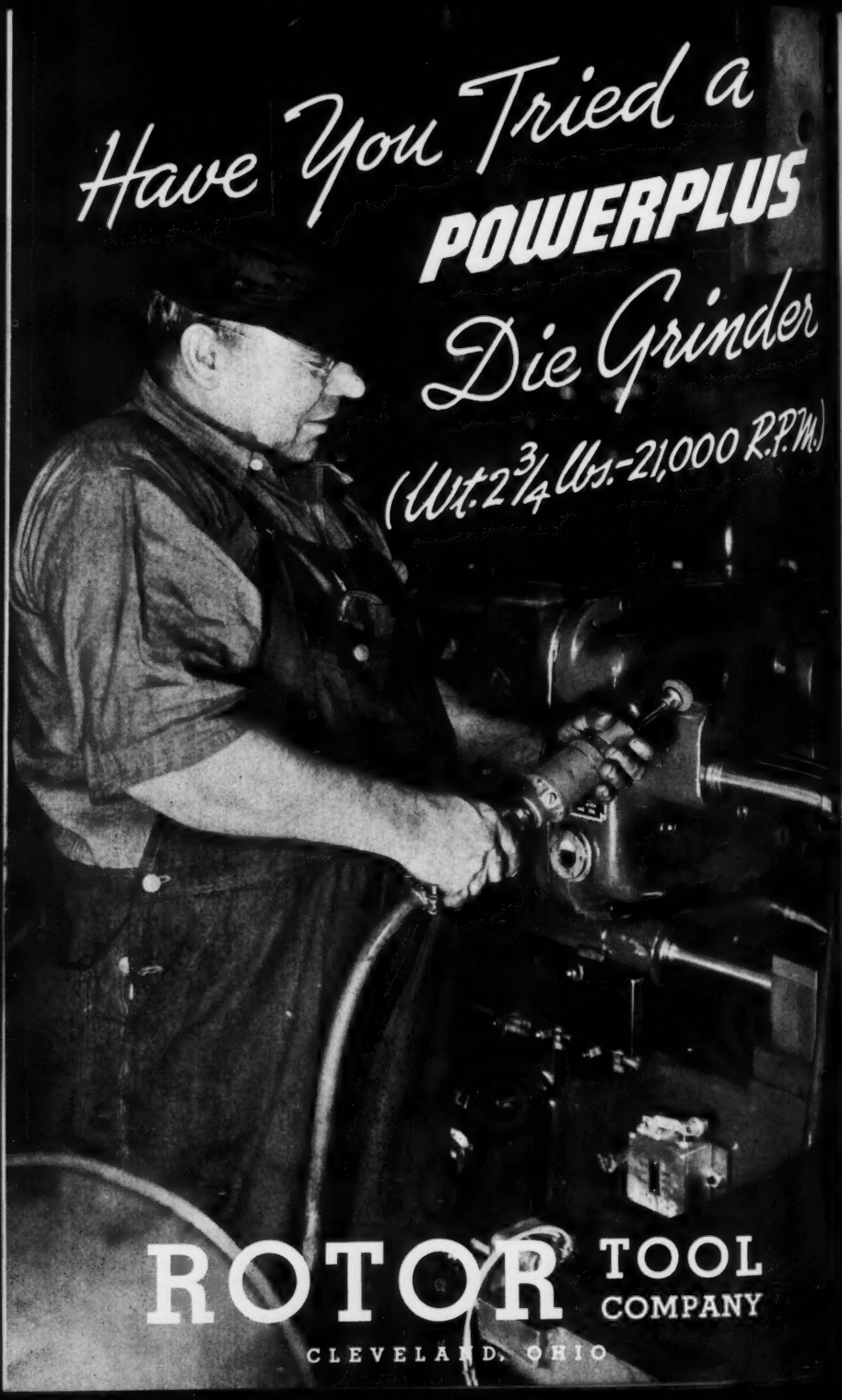
Depth of machine, 48". Width, 64¼".

Spindle speeds with 1200 r.p.m. motor: 327, 480, 660 and 990 r.p.m. With 1800 r.p.m. motor: 490, 720, 990, and 1350 r.p.m. With 3600 r.p.m. motor: 980, 1440, 1980, and 2700 r.p.m.

WRITE FOR BULLETIN 12-M.

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The General-Purpose Use of Carbide Tools, III

General-Purpose Tool Selection

By JAMES R. LONGWELL
Chief Engineer, Carboloy Company, Inc., Detroit, Mich.

GENERAL-PURPOSE use of carbide tools means the use of a relatively few "universal" tools having a wide application on the varied run-of-the-mine work that passes through the shop. Each tool must be so designed that it can be used satisfactorily on a number of jobs. In this way, carbide tool inventory is held at a minimum and the cost of each tool may be absorbed during a long period of diversified work.

In order to accomplish this, the first step is a general review of typical jobs that have passed through the shop. From this review can be determined what styles of tools can be standardized upon for wide application. In the Warner & Swasey plant, for example, an analysis showed that eight styles of carbide tools could be satisfactorily applied to a large portion of the work in the turret lathe and engine lathe departments. Plan views showing shapes of the tools selected are shown in Figure 1. Most of the operations performed by these tools are adaptable to the standard tool styles offered by carbide tool suppliers.

In making the final selection of general-purpose styles, it would be well to consult the carbide supplier as it frequently develops that, with

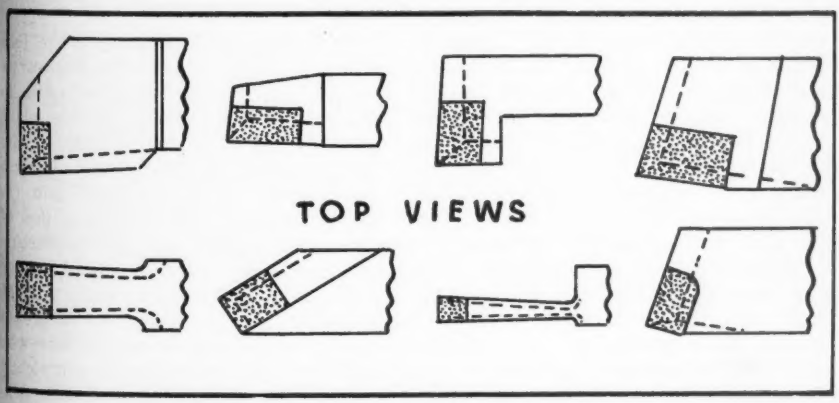


Fig. 1—Plan View Showing Shapes of Tools That Can be Applied to a Variety of Work

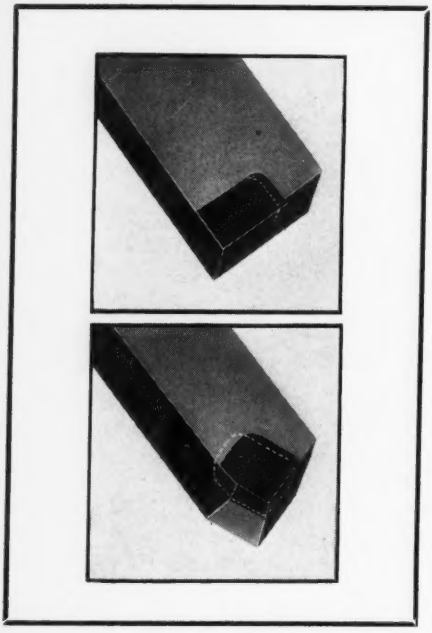


Fig. 2—Often Slight Changes in Design will Permit Use of Standard Carbide Tips at a Substantial Saving in Cost of Carbide

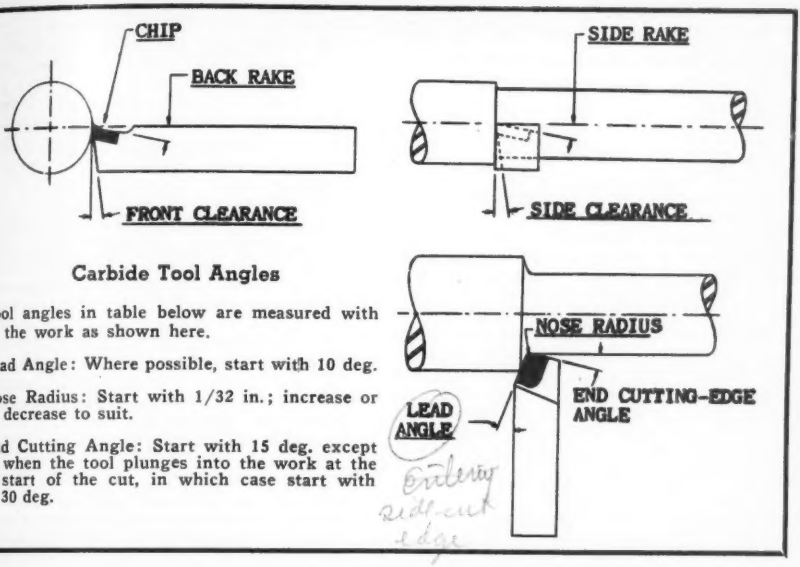
slight modifications to conform to standard carbide tools and tips, considerable economy in tool cost can be effected. Figure 2 illustrates this point. This illustration shows a tool originally selected by a user. The dotted line on the carbide tip indicates the slight modification made by the carbide supplier to adjust the design so that a standard carbide tip could be used. By making this change, the service and designated application of this tool was in no way affected, but the cost of the tool was reduced.

When selecting or designing tools for general-purpose application, listings of standard tools and tips should be available for reference so that the tools selected will either conform to, or be adaptable from, these standards. With the rapid, simplified grinding practice now available it is but a matter of a few minutes at the most to make modifications in the shapes of standard tools, and the slight loss of carbide through grinding is usually more than offset by the saving in initial cost.

No attempt is to be made to cover all the fundamentals of carbide tool design, as this article is intended to deal primarily with the general method of selecting the proper tools for general-purpose use. Tool design information can, however, be obtained from the suppliers or manufacturers of carbide tools.

Table 1 is of particular interest in connection with the "universal" use of carbide tools. This table gives the recommended rakes and clearances for average work and quantity production. Table 2 gives the same information for large work on heavy boring mills, heavy lathes, and so on. In each case, the rakes and clearances are given in two ways: The bold figures indicate the best **average** angle to use, while the light face figures above this show the range of probable angles for those who have occasion to vary the original starting angles. This data is given for all of the most common types of materials being cut today.

Review of past representative jobs plus observation of current work should enable the man selected to control carbide tool use in the plant to set up general standards having wide application. With proper grinding equipment in the tool crib (to be described later) and the use of composite angles so that the carbide tip need only to be ground, minor changes in tool angles can rapidly be made when necessary. Under proper conditions, there is no reason why carbide tools cannot be as completely flexible and applied in the same general-purpose way as high speed steel



Carbide Tool Angles

Tool angles in table below are measured with the work as shown here.

Lead Angle: Where possible, start with 10 deg.

Nose Radius: Start with 1/32 in.; increase or decrease to suit.

End Cutting Angle: Start with 15 deg. except when the tool plunges into the work at the start of the cut, in which case start with 30 deg.

TYPE OF STEEL		FOR AVERAGE WORK AND QUANTITY PRODUCTION				FOR LARGE WORK ON HEAVY BORING MILLS, HEAVY LATHES, ETC.			
		Front Clearance	Side Clearance	Back Rake	Side Rake	Front Clearance	Side Clearance	Back Rake	Side Rake
CARBON	S.A.E. 1010–1030	6–12 8	6–12 8	6–15 6	8–15 10	6–10 6	6–10 6	0–6 0	6–10 6
	S.A.E. 1030–1095	6–10 8	6–10 8	0–10 0	8–15 8	6–10 6	6–10 6	0–6 0	6–10 6
FREE CUTTING	S.A.E. 1112–1120	6–12 8	6–12 8	0–15 6	8–15 10	6–10 6	6–10 6	0–6 0	6–10 6
	S.A.E. X1314–X1340	6–10 8	6–10 8	0–10 0	8–15 8	6–10 6	6–10 6	0–6 0	6–10 6
MN.	S.A.E. T1330–T1350	6–10 8	6–10 8	0–10 0	8–15 8	6–10 6	6–10 6	0–6 0	6–10 6
NICKEL	S.A.E. 2015–2320	6–12 8	6–12 8	0–15 6	8–15 10	6–10 6	6–10 6	0–6 0	6–10 6
	S.A.E. 2330–2350	6–10 8	6–10 8	0–10 0	8–15 8	6–10 6	6–10 6	0–6 0	6–10 6
NICKEL CR.	S.A.E. 3115–3130	6–12 8	6–12 8	0–15 6	8–15 10	6–10 6	6–10 6	0–6 0	6–10 6
	S.A.E. 3135–3450	6–10 8	6–10 8	0–10 0	8–15 8	6–10 6	6–10 6	0–6 0	6–10 6
MO.	S.A.E. 4130–4820	6–10 8	6–10 8	0–10 0	8–15 8	6–10 6	6–10 6	0–6 0	6–10 6
CR.	S.A.E. 5120–52100	6–10 8	6–10 8	0–10 0	8–15 8	6–10 6	6–10 6	0–6 0	6–10 6
CR. V.	S.A.E. 6115–6195	6–10 8	6–10 8	0–10 0	8–15 8	6–10 6	6–10 6	0–6 0	6–10 6
	CAST STEEL	6–10 6	6–10 6	0–10 0	6–10 6	6–10 6	6–10 6	0–6 0	6–10 6
	STAINLESS STEEL			ON APPLICATION					

Table 1—Design Data Such as This is Now Available Covering all Ferrous, Non-Ferrous, and Non-Metallic Materials. Bold Face Figures in the Section at the Right Indicate Recommended Starting Angles, and Light Face Figures Indicate Range of Possible Adjustment

tools.

Part IV of this series, to appear in the November issue, will discuss the selection of general-purpose carbide grades for shop-wide use.

Johnson Universal Bronze Bars, product of the Johnson Bronze Co., 590 S. Mill St., New Castle, Pa., are discussed in detail in a four-page bulletin released by this firm. Copy free upon request.

P & W "Pilot" Cylindrical Plug Gages for use in the simple gaging of small and large holes in parts such as gears, and so on, are illustrated and described in a four-page bulletin published by Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford, Conn. Copy free upon request.

Saginaw Conveyor Equipment Catalog 140. The complete line of conveyor equipment available from the Saginaw Stamping & Tool Co., Saginaw, Mich., is covered in a 52-page catalog published by this firm. The line illustrated and described includes various types of trolley wheels, roller turns, rollers and turns, trolleys, wheels and brackets, lubricators, belt conveyor rolls, roller conveyors, and so on.

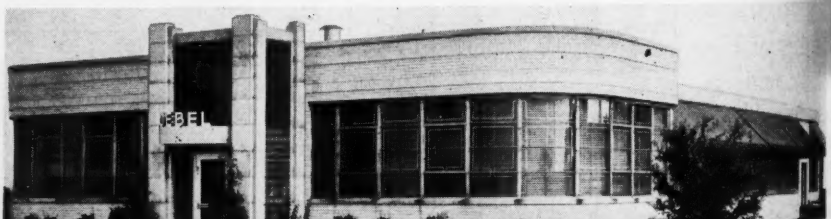
Copy of Catalog 140 is available free to any mechanical executive.

Boice-Crane Helmet Head Drill Presses. An eight-page folder on Boice-Crane Series 2600 Helmet Head Drill Presses for low cost industrial drilling and tapping has been prepared for distribution by the Boice-Crane Company, 1729 Norwood Ave., Toledo, Ohio. The folder clearly illustrates the various model Helmet Head drill presses and describes their operating and construction features. Complete specifications are also listed. Copy free.

"Cut Steel Profitably with Kennametal Tools and Blanks." A six-page bulletin describing how Kennametal is manufactured, where it can be used, and why it is said to be an excellent tool material for machining steel of all hardnesses up to 550 Brinell has been issued by McKenna Metals Co., 300 Lloyd Ave., Latrobe, Pennsylvania.

Entitled "Cut Steel Profitably with Kennametal Tools and Blanks," the bulletin contains complete factual data on the new hard carbide tool material. Three tables describe (1) the comparative physical properties of Kennametal, (2) materials machined with Kennametal, and (3) recommended speeds for machining steels of various hardnesses. A chart on Page 4 demonstrates the increased cutting speeds and greater hardness range of steels machined with Kennametal. Illustrations show typical turning, milling, and shaping operations employing Kennametal-tipped tools.

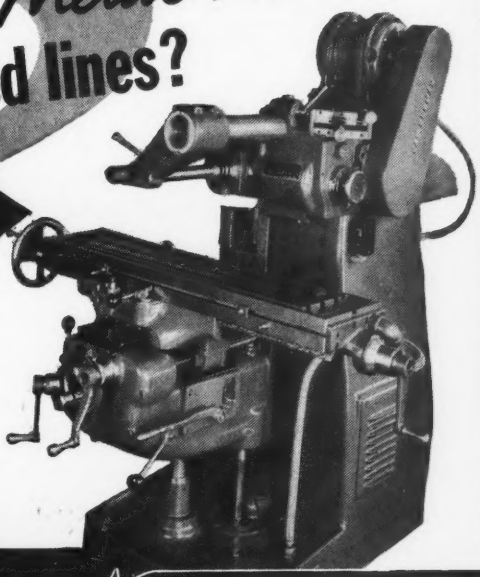
Copy of Bulletin 740 will be sent free of charge to anyone requesting it on his company letterhead.



Koebel Diamond Tool Company Occupies New Plant

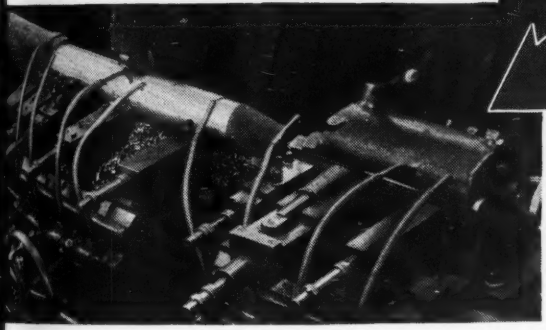
Koebel Diamond Tool Company of Detroit has moved into its new factory on Detroit's "avenue of modern industrial plants": Grinnell, fronting on the City Airport. The Koebel Company, established 1931, is largely responsible for the economical modern use of industrial diamonds. Its products are sold under the trade name Koebelite. Floor space and equipment of the new plant will increase production over that of the former quarters in Detroit's north end.

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To assure *continued* flexibility, day after day, week after week, without rot or mechanical failure—you need American Flexible Metal Hose or Tubing. Its longer life will save you money. Because it's all-metal, oils can't rot it. And the longer it's used the more flexible it becomes.



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1940 *Metal Congress and Exposition*

Will be Largest in History of Event

THE 1940 National Metal Congress and Exposition, combining the metal world's largest industrial exhibit for the year with sessions of principal technological societies dealing with metals, will be held at the Public Auditorium, Cleveland, Ohio, for five days beginning October 21st.

The 1940 Metal Congress and Exposition will be the largest in the twenty-two year history of the event, according to William H. Eisenman, Managing Director. More than 100,000 square feet of exhibit space have been engaged by exhibitors representing every branch of the metals and associated industries. Extensive technical programs of the American Society for Metals, The American Welding Society, The Wire Association, and the Iron and Steel Division and Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers will be held in conjunction with the Metal Show. Technical sessions are scheduled to be held in three Cleveland hotels as well as at the larger meeting rooms in the Auditorium.

The theme of the 1940 National Metal Congress and Exposition is "New Aids to Production"—an especially appropriate keynote by virtue of the gigantic defense program now under way. Every item included in the Metal Show will have direct relation to the preparedness program.

The welding industry will be represented at the Metal Show by all types of welding; arc, spot, and resistance; by gas welding, and oxy-acetylene gas and gas cutting equipment. Included in this group are electrodes and electric controllers as well as various grades of welding wire for gas and electric welding.

Heat treating furnaces of all types will be on display; salt bath, annealing-electric, gas and oil-fired; induction, atmospheric-controlled furnaces of all types and sizes. In addition the display will include furnaces and heating equipment for heating rivets and bars; industrial oil heating apparatus, and insulating materials for furnaces and electric heating elements.

Among the materials on display will be found tool steels, stainless steel, construction steel, valve steel for aircraft and automotive units, heat and corrosion-resistant alloys, sheet, strip, high speed, and other steels. Many of these steels will be in process or in use as tools.

In the non-ferrous field will be found aluminum, aluminum alloys, magnesium, copper, brass, bronzes, zinc, die casting metals, shapes, and forms, non-ferrous wire, and other alloys cast and wrought. Machinery for die casting, wire drawing, and forming will be shown, much of which will be in operation.

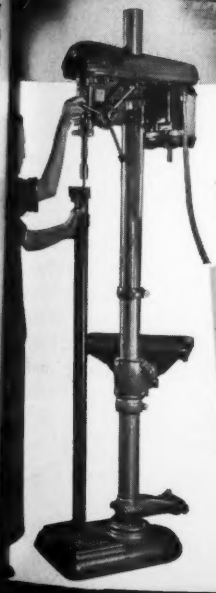
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A Delta drill press performing a special operation at the Warner & Swasey plant.

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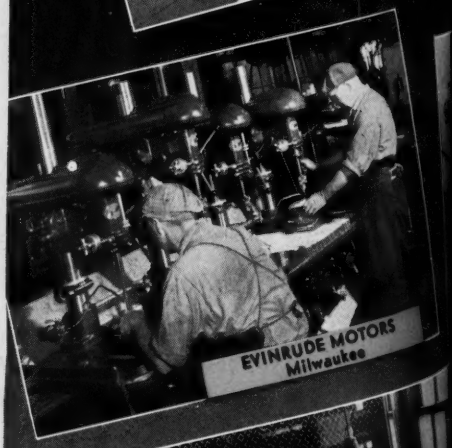
70% of all plant equipment out of date! . . .

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Here's how YOU can avoid obsolescence—increase production—cut costs—reduce investment.

Figures just published show that 70% of all American machine tools are over ten years old—practically out of date for modern production. YOUR plant equipment may be above the average, but it will pay you to investigate low cost Delta machines.

Your production problems are your own—to be solved in your own individual way. But take a tip from other progressive manufacturers—and investigate what Delta has to offer you—TODAY!



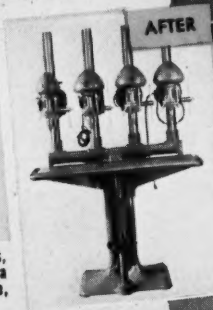
HOW MANY "CRIPPLES" ARE THERE IN YOUR PLANT?

You Can Modernize Them At Low Cost This Simple, Easy Way!



Four Delta drill press heads, mounted on old base, at a cost of $89.40 per spindle, complete.

Base and table of drill press at left were good for years of service, but heads were completely worn out.

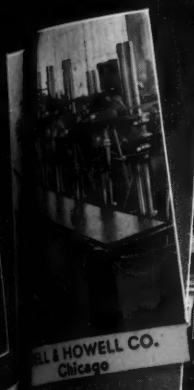




cu osts in these typical shops
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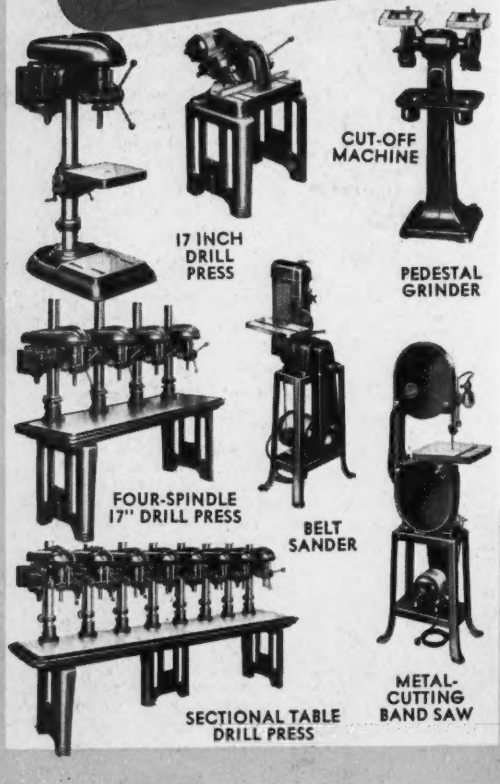


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Tools of all types will be on exhibition. These will include tungsten carbide tools and cutters, diamond tools, electric drills, hacksaws and files, and other metal manufacturing and finishing machines. Included in this group are abrasive cutting machines and abrasive wheels. Induction hardening equipment and methods will be demonstrated.

An exhibit of plating processes and materials will include plating equipment generators, plating barrels, polishing lathes, and other equipment essential to the plating department or plant.

Hundreds of other aids to better production will be shown. Included will be heat treating materials, carburizing salts, handling equipment such as cranes, trucks, and hoists. Pieces of optical measuring, metallographic, and spectrographic equipment, blue printing machinery, and drafting room equipment are to be displayed. Laboratory equipment will include polishing machines, chemical determinators, and other items for chemistry laboratory work.

Added to the above list will be petroleum products, quenching oils, metal cleaning compounds, sand blast equipment, detergents, safety equipment, X-ray equipment, turbo compressors, and many other items.

The American Society for Metals technical program will consist of 67 papers, to be delivered in 14 sessions. Included will be a symposium on



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"Surface Treating of Metals," and afternoon lecture course on "Strength of Materials Under Combined Stresses," and an evening course on "Quenching of Metals."

The Edward DeMille Compbell Memorial Lecture will be delivered on Wednesday morning, October 23rd, following the annual meeting of the A. S. M. This year's Campbell Memorial Lecture will be prepared and delivered by Dr. Samuel L. Hoyt of Battelle Memorial Institute.

The educational lectures on the ASM program will include daily talks by Dr. Maxwell Gensamer of the Carnegie Institute of Technology. Evening lectures in the educational series will be delivered by A. A. Bates of Westinghouse Electric & Mfg. Co.; W. J. Conley of University of Rochester, and R. G. Roshong, Lindberg Steel Treating Company. The ASM banquet will be held Thursday evening, October 24th, at Hotel Statler. Headquarters for ASM will also be at this hotel and morning sessions will be held in the same building.

The Annual Fall Meeting of the two metals divisions of the A. I. M. E., to be held during the first three days of the Congress, will feature joint and simultaneous sessions, committee meetings, and a round table discussion on "Electrolytic Polishing." Headquarters of the society will be at the Hotel Cleveland, and the a nual banquet will be held Tuesd evening, October 22nd.

Fifty-three papers are tentative scheduled by the American Weldi Society for presentation at its ge eral sessions and groups. The annu AWS banquet will be held at th society's headquarters at the Hot Cleveland on Thursday evening, O tober 24th.

The Wire Association will prese many new and interesting motion pi tures in addition to an impressive li of technical papers and discussion Headquarters for this society will b the Hotel Carter. The banquet i scheduled for Wednesday evening October 23rd.

Hotel reservations are being mad direct through hotels and throug Mark Egan, Cleveland Conventi and Visitors' Bureau, Cleveland, Ohi

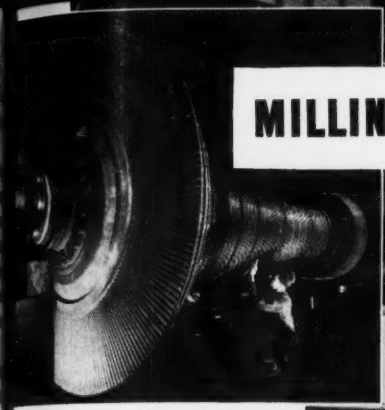
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Western Machine Tool Transmission A complete line of transmissions f motorizing all types of machine too is illustrated and described in a fou page bulletin now being published b the Western Mfg. Co., 3428 Scotten Av Detroit, Mich. The line includes thr models: namely, the Western Maste for machines requiring from 1 to 5 h motors, the Western Major for ma chines requiring from 5 to 10 h.p. mo tors, and the Western Super for ma chines requiring over 10 n.p. motor The latter unit is specially built to me requirements. Copy of bulletin free upo request.



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...is is just another case where Barber-Colman Complete Cutter ...vice has found the answer to a difficult milling problem. On ...e milling job that has caused you trouble, why not try Barber-...man Cutters. A trial order will give you positive proof.

If you haven't received Barber-Colman Catalog K write for your copy today, giving also the name of your company. It contains 223 pages of handy information on cutters, milling, cutter sharpening, reamers, hobs, gears, and splines.

Brief Job Data

Name of Part — Cylinder Blower Spacers for Allis-Chalmers Steam Turbine.

Material — Stainless steel.

Operation — Milling inside form of spacers.

Holding — Special fixture.

Cutters — Barber-Colman High Spiral Formed Cutter; tooth form held to + 0.002" − 0.000".

Feed — 1.500" per minute.

Speed — 35 r.p.m.

Production Time — 2 minutes and 30 seconds per piece, floor-to-floor.

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Fall Meeting of A. S. T. E.
to be Held at Cincinnati, Ohio
October 17, 18 and 19

IMMEDIATE and long range problems of special education to meet the increasing national shortage of tool engineers and designers, as well as skilled craftsmen for industry, will be the prime subject at the Semi-Annual Meeting, American Society of Tool Engineers, scheduled for Cincinnati, October 17th to 19th. General sessions of both the first two days will be given over to this subject, with only the last day's general session devoted to technical problems, so seriously is the Society considering the educational problem.

In addition to the report of the Educational Committee, which, under Chairman H. D. Hall, has been developing a projected special high school-industrial curriculum, the sessions will be highlighted by a number of important addresses on various phases of the question. In this connection, one important aspect to be discussed at the meeting is whether or not industry should assume the burden of special education.

"Importance of Engineering Preparedness" will be the topic of F. E. Searle, head of the Ford Trade School. Dr. R. C. Gowdy, Dean, College of Engineering and Commerce, University of Cincinnati, will discuss "Cooperative Education." "Industry's Post-Graduate Course" is the subject of a discussion by W. S. Dowman, Asst. Director, Sales and Office Personnel, Goodyear Tire & Rubber Company. Whiting Williams, Industrial Consultant, will talk on "What W Can Learn From Europe," whi George Schiele, Chief Inspector a Member of the Board, Cincinn Milling Machine Company, will le the discussion on the various paper

Saturday's technical session will b devoted to a symposium on "Ge Finishing" with papers on the va ous methods of finishing gears pr sented respectively by Marvin Anderson, Vice President, and Charl Staub, Chief Engineer, Michigan To Company; Otto H. Schafer, Presiden Schafer Gear Works; I. J. Gruenber Chief Engineer, Gear Grinding M chine Company; and Charles Pfeff in Charge of Gear Development an Production, Wright Aeronautical Co poration.

Arrangements have been made that Tool Engineers may visit Cin cinnati's various machine tool and i dustrial plants, including Cincinna Milling Machine Company, Cincinna Bickford, Cincinnati Planer, LeBlon Machine Tool Company, Lodge an Shipley, Cincinnati Shaper, Gr Planer, King Machine Tool Compan American Tool Works, Crosley Rad Corporation, National Cash Regist Company, Frigidaire Corp., the Car ton Company, Aluminum Industri and Procter and Gamble.

Concentration of machine tool co panies in Cincinnati area was a m jor factor in the selection of this c for the convention.

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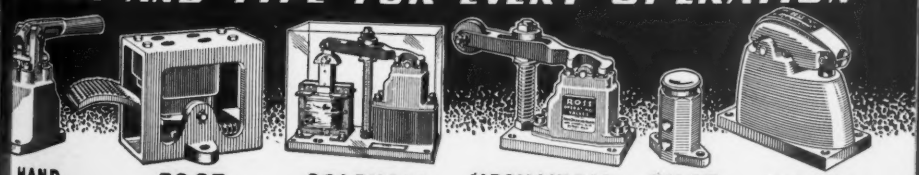
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Modern Equipment at Work

Broaching Operation on Shells

HAVING determined that defense measures are necessary to the peace of America, speed becomes a prime essential. It follows, therefore, as a matter of course that the fullest possibilities of the broaching operation should be investigated as a manufacturing operation on munitions and war machinery.

The two illustrations included here present the newest method of producing "bourrelet" grooves on an 81 mm (3⅛ in.) shell. The machine is a standard American Broach & Machine Company's No. V2 6-Ton Vertical Hydraulic Press, equipped with control latch to hold the machine in the lower position while the operator is indexing or unloading workpiece. It also has a speed control unit.

The illustration Fig. 1 shows machine with the work-holding portion of the fixture tilted back to loading or indexing position. A counterbalance is provided on the fixture trunnion shaft to facilitate the operation. In the clamped position, shown, the part is centralized at both ends and supported by means of an automatic jack directly behind the broaching cut.

The design of the fixture is such that the part can be clamped down into the bottom locator and indexed for the required number passes without being unclamped. Manual indexing is obtained by release of the index plunger, controlled by a lever upon the top of the fixture. The indexing is done by means of the same knurled wheel that is used to chuck the boat tail end of the part.

Figure 2 shows the fixture with the workpiece in broaching position. The shell nose rests in a formed adapter and the boat tail is

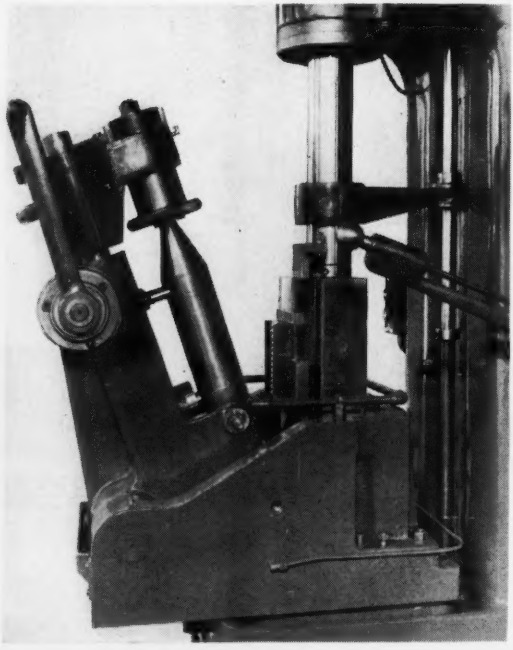


Fig. 1—Work-Holding Portion of Broaching Fixture for Broaching Grooves in Shells, Tilted Back to Loading Position

WHEN THE ORDER CAME TO SPEED UP PRODUCTION

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you able to keep step with orders??
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s were laying down on the job??

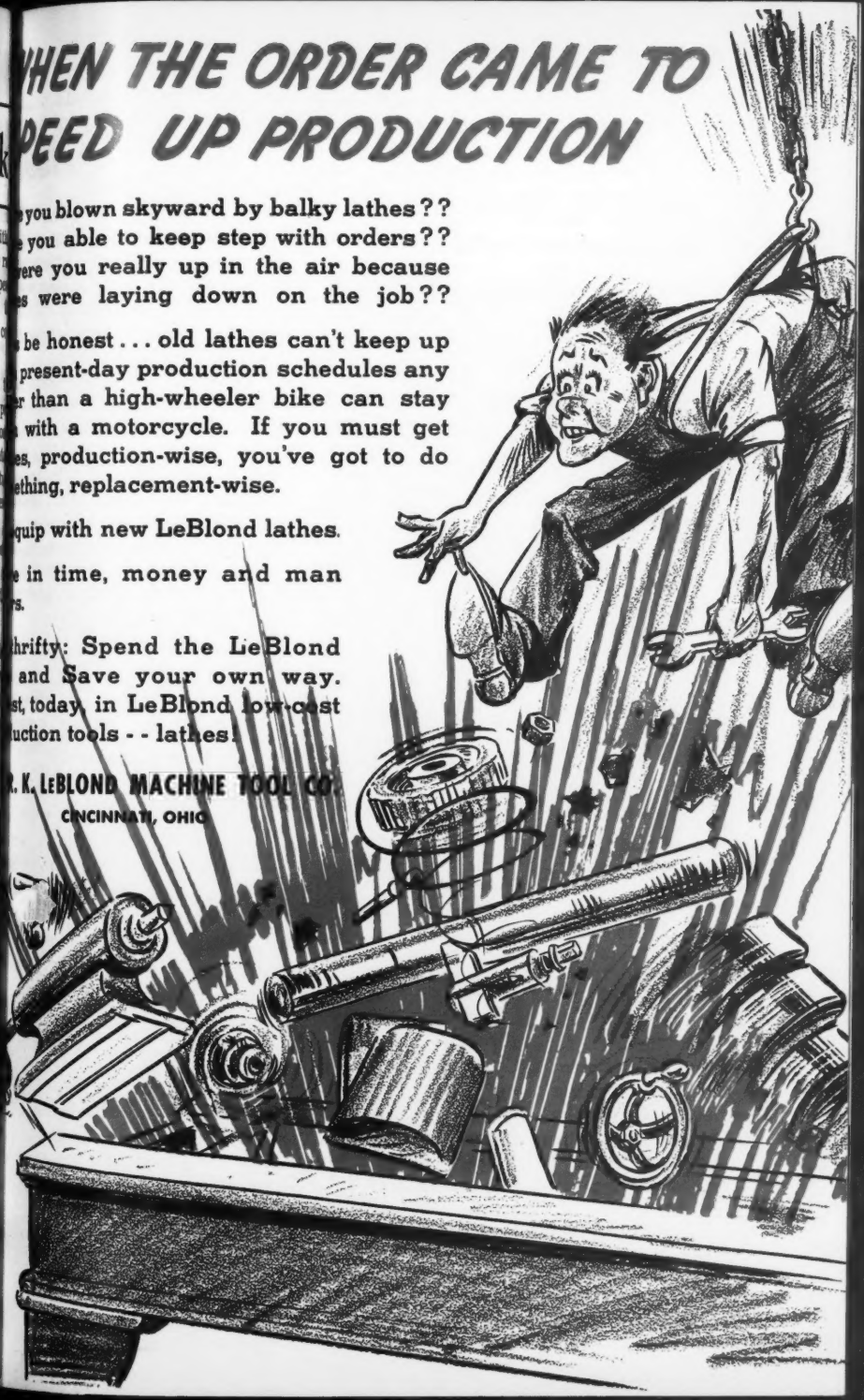
be honest . . . old lathes can't keep up present-day production schedules any r than a high-wheeler bike can stay with a motorcycle. If you must get es, production-wise, you've got to do thing, replacement-wise.

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in a chuck operated by the knurled handwheel. The work is clamped in the bottom locator by means of the fixture lever shown in center of photograph. The broach section is limited in length by the distance between the rear and the forward bourrelets.

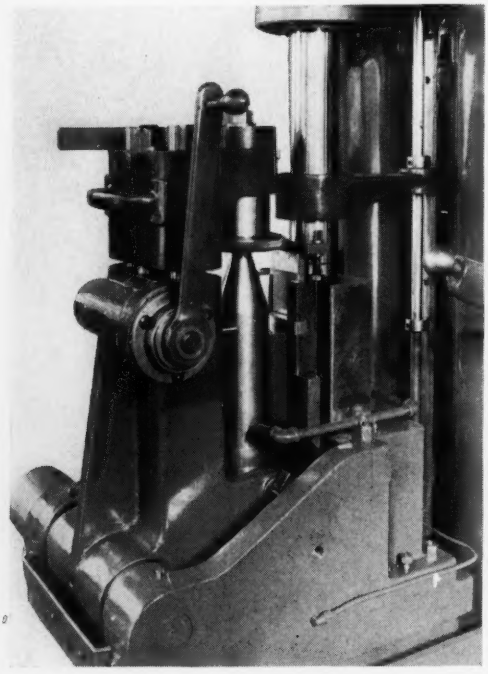


Fig. 2—Shell in Broaching Position to Have Grooves Broached on Sides

The broach section is mounted upon a hardened and ground broach holder assembly that is guided in the fixture, means for adjusting the broach being provided by a taper wedge shown on the top of the broach holder assembly that is guided in the work-holding portion of the fixture is securely latched in place.

The operation cycle is as follows: (1) Load part into bottom locator; move down upper fixture assembly by means of right hand lever; chuck part upon boat tail end (with fixture in loading position as shown in Fig. 1). (2) Tilt fixture forward to broaching position (as shown in Fig. 2). Start broaching stroke. (3) Machine ram is latched at down position at end of broaching stroke. fixture automatically unlatches. Return fixture to indexing position (Fig. 1) manually. Index part by manually releasing index plungers and turning knurled wheel shown above boat tail end of part. (4) Release machine control latch (shown at right center in Fig. 1), thus allowing machine ram to return to upper position. (5) Manually tilt fixture to broaching position (6) Repeat above operations until all grooves have been broached, and unload finished part.

The material is free machining steel. The length of the cut is approximately 1⅛ in., and the depth of the cut is approximately 0.025 in. With an operation cycle of 45 seconds, production is 70 pieces per hour at 85 per cent efficiency.

Railroad Shop Solves Problem with Modern Tool

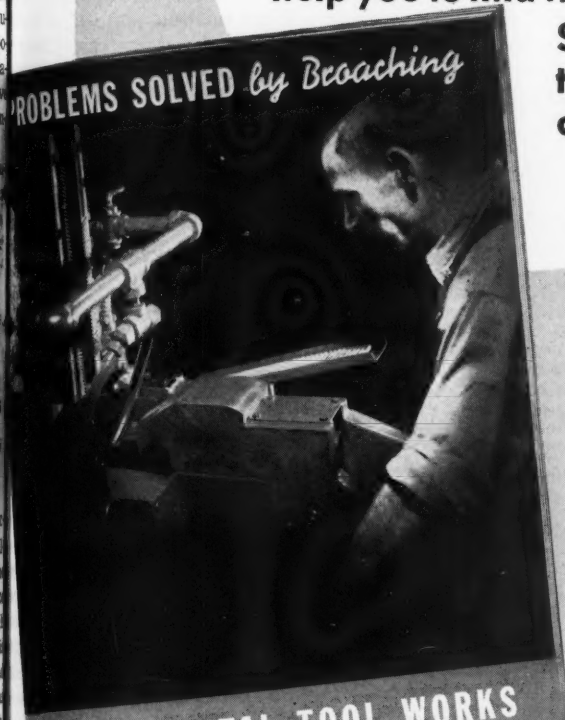
THE operation of turning and facing side rod bushings in a railroad shop was made difficult by the combination of hard, sandy bronze and the ⅜-in. lubrication holes which are included in the design of this piece. Using the tools which have been standard for many years, it was impossible to complete a piece without stopping at least once to grind the tools.

The machine in use on this operation is the usual engine lathe. The

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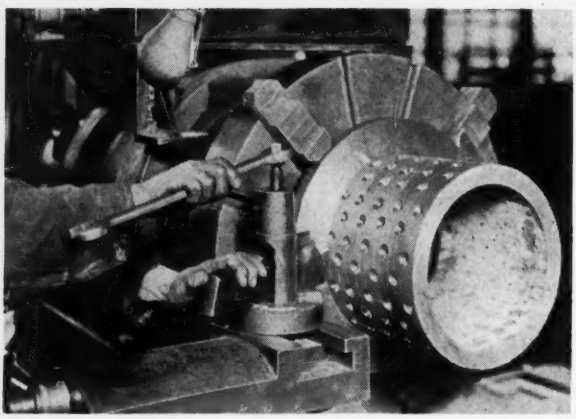
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Despite the countersu holes which provide the ma mum in intermittent cutti on a cylindrical surface, s rod bushings such as this o are turned and faced w higher production than h been found possible with too previously used.

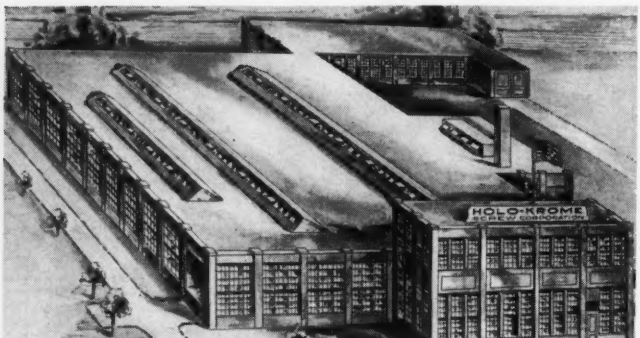
tool travel is 11 in., and the turning operation is performed at a speed of 150 surface feet per minute with a 5/64-in. feed. An Armstrong tool-holder is used, and th tool in use now is ½-in. square toolbit Rexalloy. Despite th intermittent cut cause by the countersu holes with which th surface of the bushing is filled, at lea one bushing can be turned and face complete before tool grinding b comes necessary.

Time and Motion Study Clinic

The Time and Motion Study Clinic of the Industrial Management Society, which last year was attended by more than a thousand people, will be held this year on November 8th and 9th at the Chicago Towers Club, Chicago, Ill. William F. Entorf is Program Chairman. The program will include papers by well-known authorities, and the subjects presented will include the newest developments in time and motion study application. Executive offices of the Industrial Management Society are locat at 205 West Wacker Drive, Chicago,

Holo-Krome Expands Plant

In spite of the fact that less than year ago a large addition was built on the plant of the Holo-Krome Scre Corporation, Hartford, Conn., this fir has found it necessary to provide add tional manufacturing facilities. Accor ingly, an addition is now under co pletion which will be 100 x 200 feet size. Features of t addition are co insulated roof hardwood blo flooring, and newest in heat and lighting s tems.



W. A. Pur President of Ho Krome, says th this expansion not caused by particular influx war or rear ment orders, is due almost tirely to dome consumption.

NEW LOW Carbide Cost boon to machinists as Defense orders pour in

Down went the price of Tungsten Carbide last fortnight, which should facilitate the nation's effort to speed up heavy industry production. Significant, however is the fact that every machine shop operator—"the little fellow" as well as Mr. Big—will profit more through Tungsten Carbide's cost-cutting advantages as a cutting tool. For as every machinist knows, Carbide saves time in machining, annealing and tool grinding.

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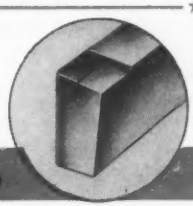
A FEW OF THE MANY COST-CUTTING ADVANTAGES OF TECO METAL

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* Tungsten Electric supplies Carbide blanks, tools and bits. Wire and bar dies, tubing, extruding and sizing dies. Also special tools, such as spot facers, reamers, broaches, form tools, etc.

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Warns of Sabotage Fire Threat

War Orders and Defense Speed-up Give 1940 Fire Prevention Week Special Import, John Kidde Says

WITH America's industrial structure already being weakened by fire at the rate of more than $10,000,000 a month, and with the threat of "speed-up" and sabotage fires greater than at any time in American history, this year's Fire Prevention Week from October 6th to 12th has a far greater significance than ever before. This is the burden of a statement issued this month by John Kidde, New York engineer who has spent many years studying fire protection methods.

No country that accepts foreign war orders can hope to escape sabotage fires, Mr. Kidde points out. Factories engaged in our own national defense orders are also the target of saboteurs and foreign agents, and because these "torches" are better organized and more ingenious than ever before, industry must perfect its fire defenses lest its military defense program bog down. With their surprising knowledge of America's interdependent production set-up, saboteurs can tie up entire industries by putting the torch to a "bottle-neck" plant, or merely to a department performing a single vital operation on a product.

The effectiveness of fire as an industrial wrecker is shown in the tactics of European bombers, Mr. Kidde points out, for incendiary bombs are used even more widely than high explosives, and their targets are almost always factories. And the "bombs" of saboteurs—ingenious devices such as self-obliterating le tubes containing fire-setting chem cals—have an even better chance achieving their purpose because th are totally unexpected.

Speeded up production is anoth source of fire danger which factor men should watch, according to M Kidde. During periods of frantic w preparation, when new plants are p up almost overnight and manageme concentrates on maximum outpu normal precautions are often ignore and fire hazards are allowed to exis

Although most of America's indu trial fire loss so far has been th work of "General" Carelessness, ma manufacturers depend upon ant quated extinguishing equipmen which has been rendered obsolete b vast changes in our industrial produ tion methods. For example, since th World War millions of new fire ha ards have come into use; millions gasoline-burning trucks, tractors a material-handling machines, billio of gallons of combustible fuels, a a tremendous amount of flammab liquids and synthetic products. Ma plants where such hazards exist s depend on extinguishers which a literally of World War vintage, wh statistics clearly show that flamm ble liquids are involved in the maj ity of sabotage fires.

Synthetic rubber, lacquers, hig test gasoline, Diesel fuels, new s vents, chemicals used in plasti synthetic finishes, acetate and ray yarns, and the infinite variety of s

ents and petroleum products are ted as a few of these materials and rocesses which have posed new roblems in fire protection in the last w years. And when one adds to ese munition plants, airplane and gine plants, and a host of chemical ctories all working at top speed, the portunity for crippling fires is im-ensely broadened.

Manufacturers are urged by Mr. ide not to embark on "witch-nts" among their employees, but ther to follow three simple steps. irst, institute a campaign for top tch plant housekeeping, to elimi-te unnecessary hazards and care-ss habits. Second, teach employees w to fight fires, organize fire bri-ades and stage frequent fire drills. hird, analyze the hazards in plants d warehouses and adopt the most vanced fire safeguards. In this last ep, the advice of insurance men, e department officials and manu-cturers of fire protection equipment n be of great help.

"Selecting the Right Steel for Plastic olding." A handy eight-page booklet r use in selecting the proper steels plastic molding is now being issued the Crucible Steel Co. of America, 5 Lexington Ave., New York, N. Y. cluded in the booklet are illustrations owing several different types of molds d dies made from various grades of ucible steel and how they are used molding plastic products. Copy free on request.

U. S. Multi-Miller Bulletin No. 40 (F). descriptive eight-page bulletin on S. Multi-Millers is now being pub-hed by the U. S. Tool Co., Inc., Am-e (East Orange), N. J. The bulletin ustrates the application of the Multi-llers for continuous milling of form ck, rotary milling, automatic cut-off erations, automatic indexing, vertical lling, and high speed grinding. Copy Bulletin No. 40 (F) free upon re-est.

DoALL RELEASES OTHER MACHINE TOOLS ON URGENT DEFENSE JOBS



Chrome Vanadium Steel Part for hydraulic press. Made by Burndy Engineering Co., New York.

Former milling time ..... 13 hours
The DoAll removed sections shown in 37 minutes, reducing the finish milling to ..... 2 hours

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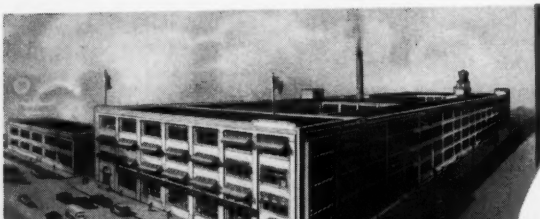
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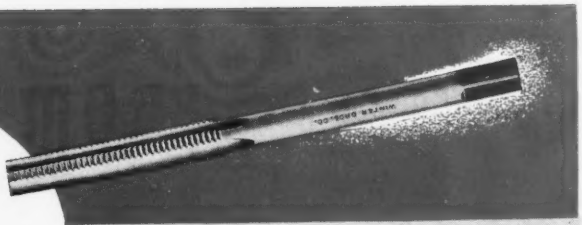
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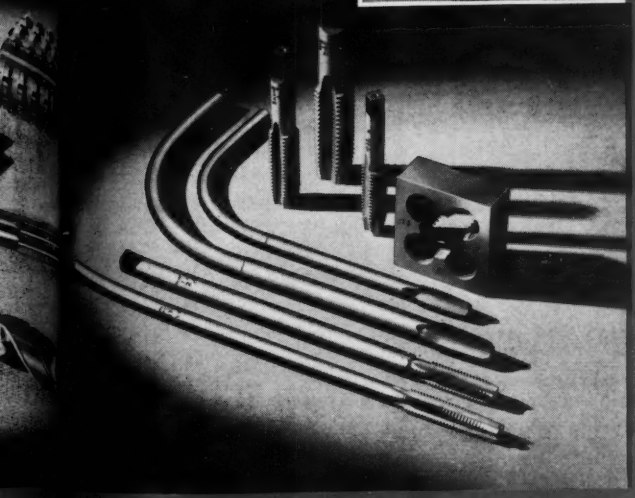
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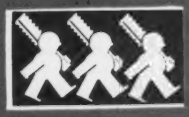
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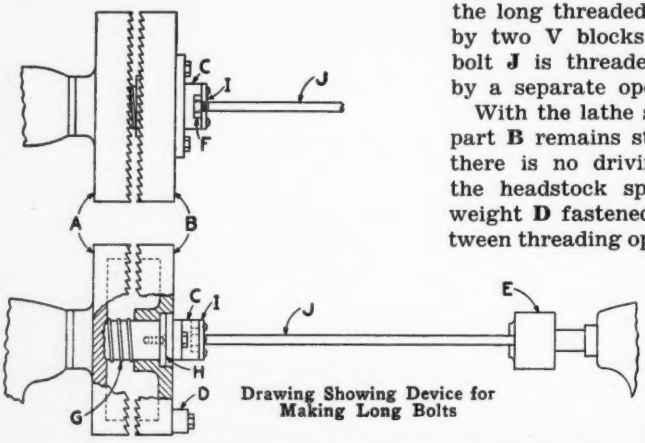


IDEAS FROM READERS

Making Long Bolts

By L. KASPER

A LARGE number of long bolts were made by using rods threaded on both ends, with a nut screwed and brazed on one end to form the head. In order to facilitate the threading and to reduce handling, the device shown in the drawing was designed.



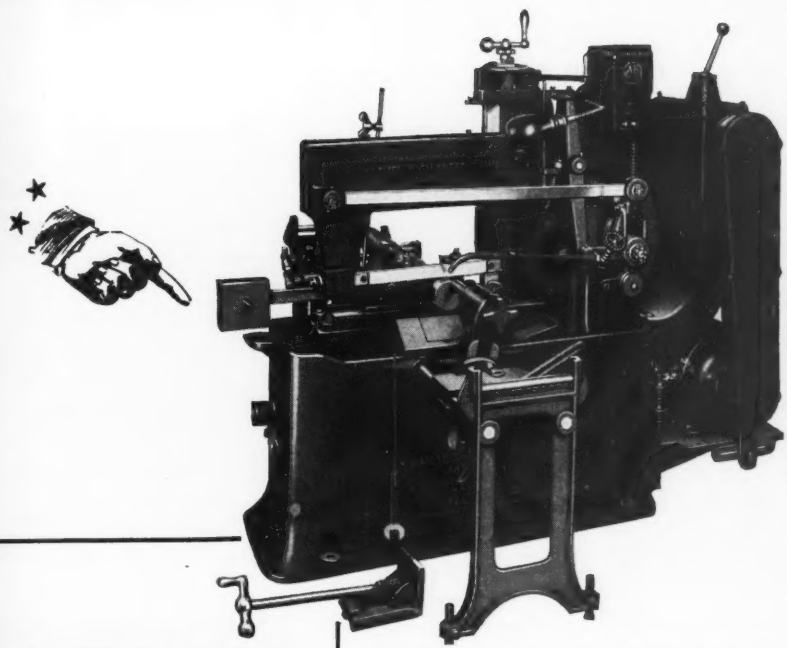
Drawing Showing Device for Making Long Bolts

Referring to the drawing, the part **A** is threaded onto the nose of the lathe spindle and rotates with it. Part **A** is provided with a long hub on which the part **B** is supported and is free to rotate. Both parts **A** and **B** are serrated as shown, so that when brought into contact, the serrations engage and the two parts rotate as a unit. The spring **G** serves to separate the parts during the loading period, the washer **H** limiting the end movement of part **B.**

Part **B** carries the fixture **C**, which is grooved to accommodate the nut **F**, the nut being retained in the groove by the slotted plate **I.** The self-opening die head **E** is carried in the tailstock spindle of the lathe and the long threaded bolt **J** is supported by two V blocks (not shown). The bolt **J** is threaded on the head end by a separate operation.

With the lathe spindle rotating, the part **B** remains stationary insofar as there is no driving connection with the headstock spindle. Due to the weight **D** fastened to the part **B**, between threading operations, the fixture **C** is stopped with the open side of the groove upward into which the nut **F** is dropped. The threaded end of the long rod **J** is passed through the plate **I**, which guides the rod so that it registers with the hole in the nut **F.** The blank end of the rod is started in the guide of the die head **E.**

As the tailstock spindle is fed toward the headstock, the part **B** is forced back until the serrations register with those in part **A**, at which



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time **A** and **B** lock and rotate as a unit. This causes the nut **F** to be screwed onto the rod **J** until it reaches the end of the thread, at which point the rod turns with the nut, thereby causing a thread to be cut on the opposite end of the rod by the die head **E**. When the end of the rod strikes the stop inside the die head, the latter is opened.

As the tailstock spindle is withdrawn, the spring **G**, acting on part **B**, disengages it from part **A**. The rotation of part **B** then ceases, the part coming to rest with the weight **D** at the bottom and with the open end of the fixture **C** upward so that the finished bolt may be withdrawn. In this manner, locating the nut and threading the end of the rod is accomplished in the same handling and without stopping the lathe.

Handy Tool for Boring Semisphere Cavities

By A. H. WAYCHOFF

ILLUSTRATED in the drawing is a handy tool for boring semisphere cavity countersinks in wood or metal. The tool is made from an old auto tappet push rod of the type shown at **A**, cut to a length of approximately six inches as shown at **C** with

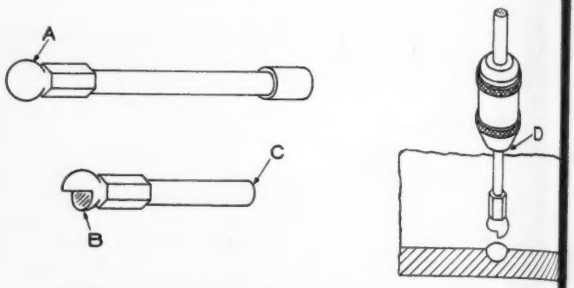


Illustration Showing an Auto Push Rod Ground for Boring Semisphere Cavities

one-fourth of the steel ball ground out as indicated at **B**.

To use, the rod is simply gripped in a drill chuck as shown at **D**.

Hard Facing Copper Jig

By JOHN E. HYLER

IN the application of hard facing material to blades of various types of grading machines, economy and quality requirements dictate the necessity for very uniform application. Once it has been determined by trial how much surface a rod of the material will cover to the desired thickness, this particular area may well



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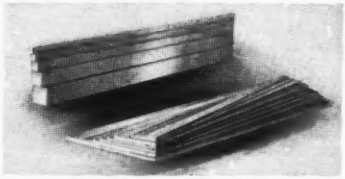
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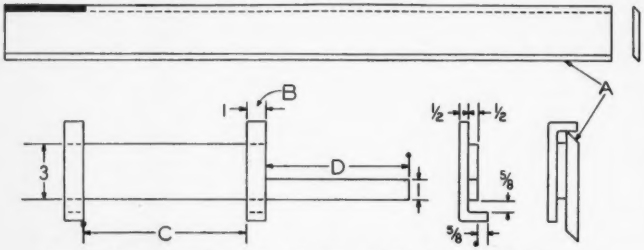
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used as a unit area of application throughout the use of a jig which lies over the blade having its edge hard-surfaced. The jig illustrated in the drawing shows how this application of hard facing material to blades can be done to good advantage.

The blade to be hard-surfaced, **A**, has two bevels so that on the machine either edge can be used for the cut. Both edges of the blade must therefore be hard-surfaced.



Drawing Showing Hard Facing Jig and Blade to be Hard-Faced

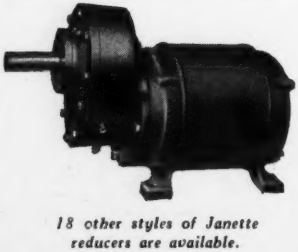
The jig to be used is made of copper so that it will not become bonded to the steel blade during the hard-facing operation. It consists of a bar of copper ½ in. thick and 3 in. wide, as shown in the drawing, the extended 1-in. end **D** serving as a marking gage.

Two 1-in. wide pieces of ½-in copper **B** are bent at the ends to form hooks and are brazed to a 3-in. bar, leaving between them a span, **C**, in this case 9½ in., just slightly longer than the length of blade edge to be covered by one welding rod of the hard facing material.

In use, the jig is laid on top of the blade, the latter being supported on a level work table, and the hooks are pushed up to engage the edge of the blade. A ⅝-in. margin of the blade is thus left exposed, the length of span corresponding to the shaded portion of the blade as shown in the drawing.

It has been found best not to proceed progressively from one end of the blade to the other, but to face a span like **C**, then skip a span of like width, then face another, then skip another, and so on, until the end of the blade has been reached. The process is then repeated, beginning again at the first end and picking up the spans that were left unfaced. This process controls the heat which is set up in the blade during the operation more uniformly, not allowing it to locate too fully at any one point at any time.

A piece of soap stone is kept at hand for marking at the end of the


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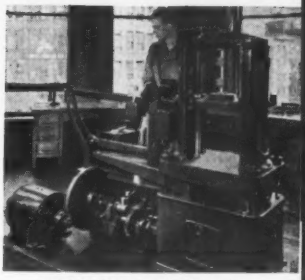




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Micro-photographing the Grain Structure



Rieble Testing for Tensile Strength

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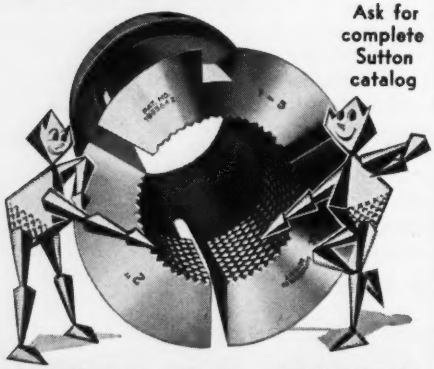


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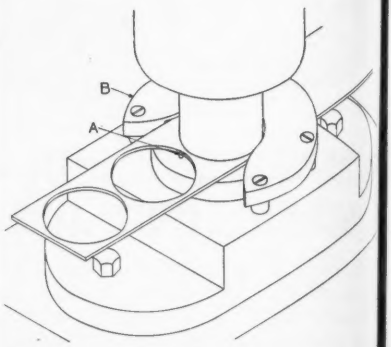
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extension **D** to show the position for the next setting of the jig. Span D plus dimension **B** must be equal in value to span **C** in order for the marking gage to function properly.

Set-Up for Punching Equally Spaced Holes in Strip Stock

By CHAS. H. WILLEY

A SIMPLE set-up for spacing and stripping coil or strip stock as the material is fed into a die to be punched with a series of equally



Drawing Showing Set-Up for Punching Equally Spaced Holes in Strip Stock

spaced holes is illustrated in the drawing herewith. The die shown is equipped with a stop pin, **A**, placed close to the forward or leading edge of the die as shown. To provide for this pin, approximately one-quarter section of the stripper and guide plate **B** has been cut out. Operation of the die for punching stock is as follows:

Stock is first fed through the guide and stripper plate **B** until it contacts the stop pin **A**. The punch is then lowered and the stock pierced. On the upstroke of the punch should the stock strip adhere to the punch shan

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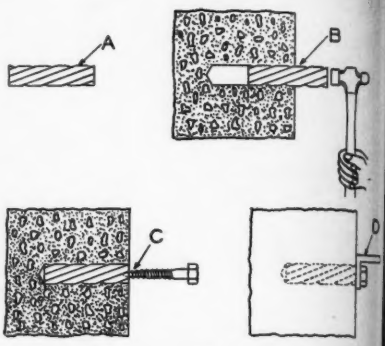
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it is immediately stripped off as it comes in contact with the underside of the stripper plate **B**. The stock is then lifted by hand off the stop pin and again fed through the guide until it engages the stop pin at the trailing edge of the hole that has just been punched. The stock is now in position for a second hole to be punched. Punching, stripping, and spacing operations are repeated in the previous manner until the stock strip has been punched with the desired number of holes.

Anchoring a Wall Mounting in Cement

By W. H. CARWAY

A DEPENDABLE method of anchoring a wall mounting in cement or brick is illustrated in the drawing herewith. Following the drilling of a hole in the wall on which the mounting is to be fastened, a piece of cable, **A**, of a diameter equal to that of the drilled hole, is cut to such a length that when the cable is driven into the wall as shown at B, the end of the cable will be flush



Drawing Illustrating Method for Anchoring a Wall Mounting in Cement

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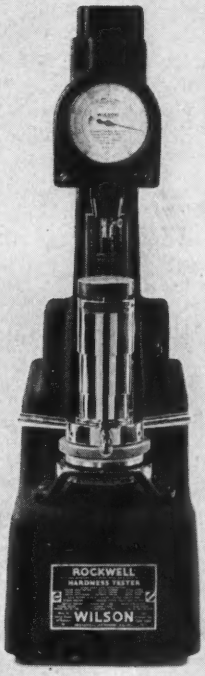


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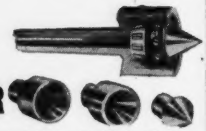


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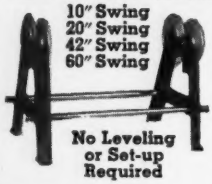
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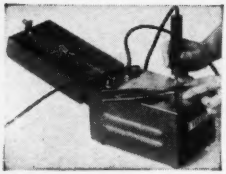
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with the surface of the hole. After the cable has been driven into the wall, it is ready to receive a lag screw, as shown at **C**.

A mounting can now be anchored to the wall by slipping a lag screw through a hole in the mounting and threading the end of the screw into the cable **A**, as illustrated at **D**. As the screw is propelled forward with the aid of a wrench or similar device, the threads of the screw are made to take a firm hold on the center strands of the cable, at the same time spreading the outer strands of the cable against the walls of the hole. In this manner, a hold is obtained that is said to be difficult to loosen by pulling or vibration. The method of anchoring just described can also be used for fastening machinery to cement floors.

Theory As Assisting Practice

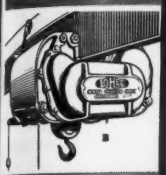
By ROBERT GRIMSHAW
Consulting Industrial Engineer

THE Western Union Telegraph Company having confided to me some wire of the (at that time) new alloy—de-oxydized bronze—for testing as to tensile strength and electric conductivity, I found that not only had one end of each 500-ft. coil greater strength and conductivity than the other, but one of the two coils was superior in this respect to the other.

This cast an unpleasant light on either the accuracy of my testing appliances, or my own ability to use them—or both. Tests of shorter sections from various parts of each coil gave similar, though less marked, results.

Inquiry revealed that the wire had been hand-drawn. Naturally the workman pulled better and drew more

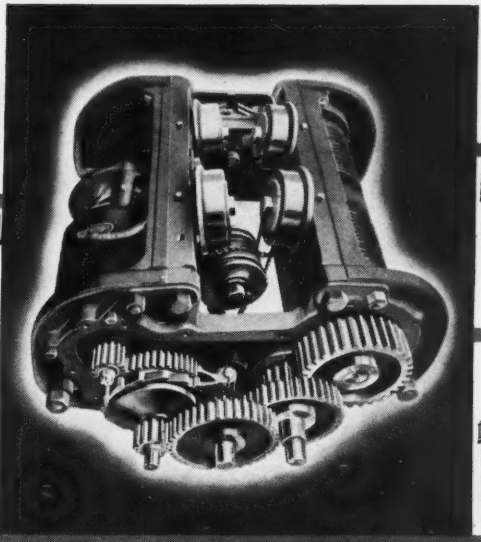


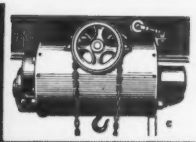


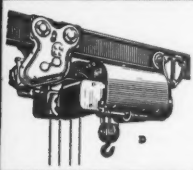
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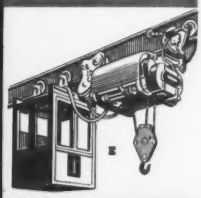
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rapidly at first, when fresh at the job, hence varying strain among the particles of the metal; when and where the strain was greatest, both the tensile strength and the electric conductivity were least. Here was proof of the correctness of Tresca's tests and theory on the fatigue of metals.

I made practical application of the knowledge thus gained by upsetting the value of many reports on the tensile strength of metals made by recognized experts, and by varying my own procedure in subsequent tests for tensile strength and other physical properties. I found that samples that resisted a strain of 27,000 lb. per square inch of cross section when broken at the usual speed of a well-known testing machine parted at 25,500 when rapidly pulled, but not jerked, and broke at 24,000 when the stress was suddenly applied.

This would indicate not only that in reports of all such tests the rate of application of stress should be given, but that all such tests should be made at varying speeds, and should give a hint to designers and constructors of machinery, and even of many appliances used in machine shop practice.

Recognition of the principle that rate of stress has an influence upon endurance of materials would—especially in these days of rush design and construction—prevent many accidents and failures in performance.

An apparent exception to the rule that haste makes for poor performance and even for danger is in the use of high speed cutting tools. But here the speed does not (as far as we know) weaken the tool against tensile stresses, but only, strange to say, hardens the point by excessive heating.

As far as I know, no tensile tests of red-hot steel have been made.



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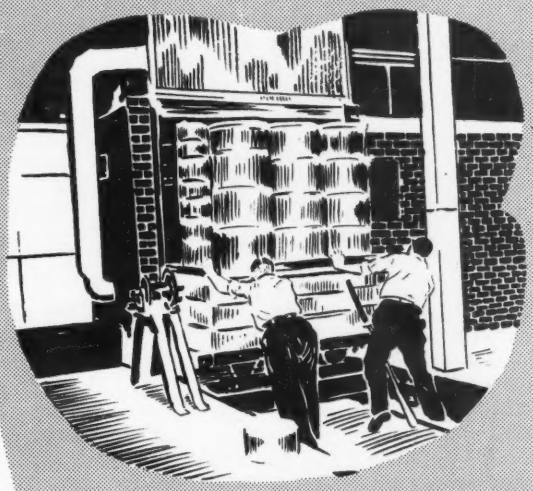
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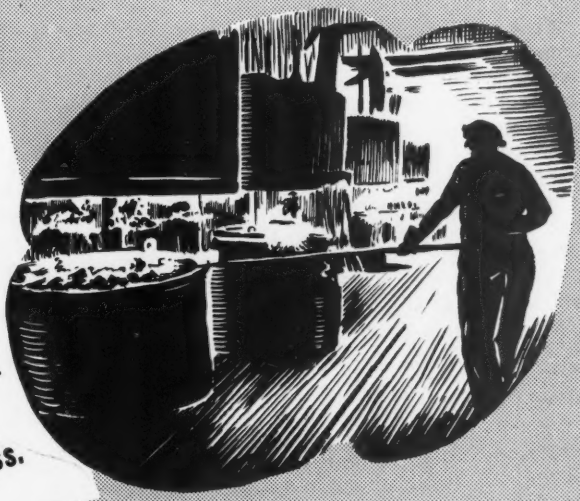
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AT last America is definitely embarked on the task of arming our nation against the Godless, piratical nations that are attempting to capture the world and divide it between them. We have hated to see this time come, and as a nation we have tried to persuade ourselves that it wouldn't be necessary. We have tried to substitute wishful thinking for intelligence, and it was only when we saw what wishful thinking had done to England that we awoke to our danger.

At last, however, we are getting some action — action on a program that will cost us, over a six-year period, some 36 billions of dollars. Already the industries involved are complaining of a shortage of skilled workers, and the status of the program, at the moment, is indicated by the fact that the amount spent on the defense program during the month of August was about 180 millions. If production proceeds according to schedule, the monthly total will soon reach 500 millions. The total amount of 36 billions will have been spent by the end of 1946.

Regardless of the outcome of events in Europe, this program is to be maintained until completed, or for the full five years. If England is able to fight off invasion, it will mean at best a long war between England and Germany with England constantly growing stronger, although depending for the bulk of her armaments upon America. In that co the United States defense progra will continue at an even pace un finished, and even then it is not lik ly that our defenses will be allowe to lapse into the state of innocuo desuetude in which they have repos since the First World War.

If England is defeated and invade by Germany, our need for defens against aggressors on both sides o us will be multiplied and it is ver possible that we may be faced wit a long and costly war for our na tional life. While the United State might not be attacked directly, an attempt would be made to set up subservient dictator states in othe parts of the Western hemisphere and we would have to go to war to maintain and support our Monroe Doctrine or be satisfied to isolate our nation from the rest of the world in a comparative state of seige, enjoying only such contact and commerce with the outside world as the dictator chose to allow us. It is inconceivable that such a state of affairs could long be allowed to continue.

In any case, the metal industries appear to be embarked upon a five-year period of maximum activity, and employers might as well face the fact that plans must be made accordingly for equipment and an adequate supply of labor. Many employers who have never considered apprentice training as a part of their personnel problems will have to make provision for such training. The National Youth Administration has already started training young men for mechanics' jobs, and will undoubtedly serve as an excellent source of supply for machine hands in future months.

Our defense program is huge and costly, but America is on the verge of the greatest crisis with which it has been faced since 1776, and we must be prepared to meet it.

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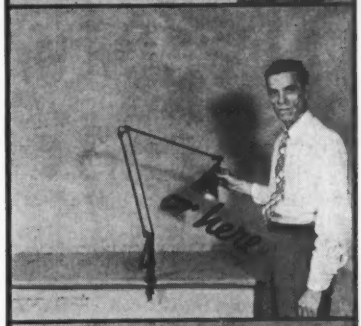
DAZOR MANUFACTURING CORP.
4483 DUNCAN AVE. ST. LOUIS, MO.

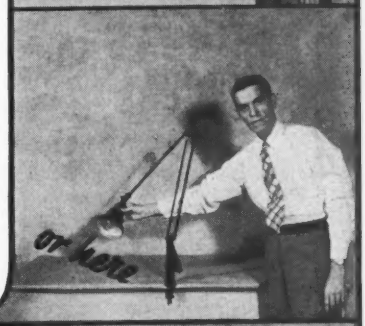
Dazor *Floating* Lamps

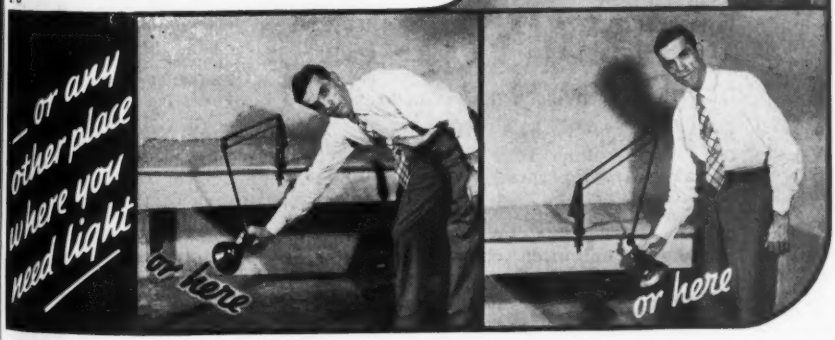
Fluorescent and Incandescent

I-3









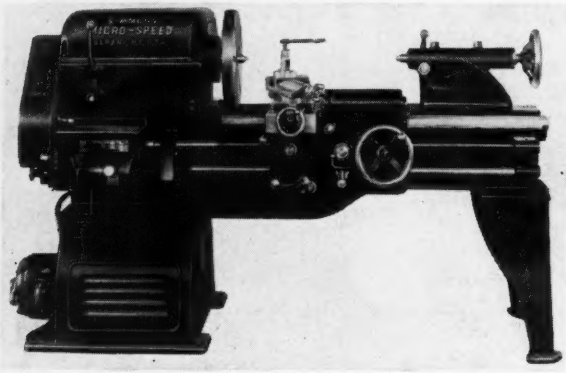


NEW SHOP EQUIPMENT

Simmons Micro-Speed Engine Lathe

The Simmons Machine Tool Corp., 1745 Broadway, Albany, N. Y., has introduced the Simmons Micro-Speed Engine Lathe shown in the illustration herewith. The lathe is built in sizes from 16 to 20 in. in the standard engine lathe and in sizes from 16x25 to 28x50 in. in the removable gap or extension bed gap lathe design.

The headstock spindle of the machine is mounted in Timken precision tapered roller bearings, assuring smooth free running at all speeds. Driven through V-belts from a Simmons Micro-Speed Drive Unit, all gears for speed changing are eliminated.



Simmons Micro-Speed Engine Lathe

The micro-speed drive unit, which is mounted in the cabinet leg, is said to provide an almost unlimited variation of spindle speeds by finger tip control. A wide range of speeds is available through a handwheel on the headstock. Motors on the micro-speed drive a built integral with the unit and can b supplied in any phase, cycle, or volta of alternating current.

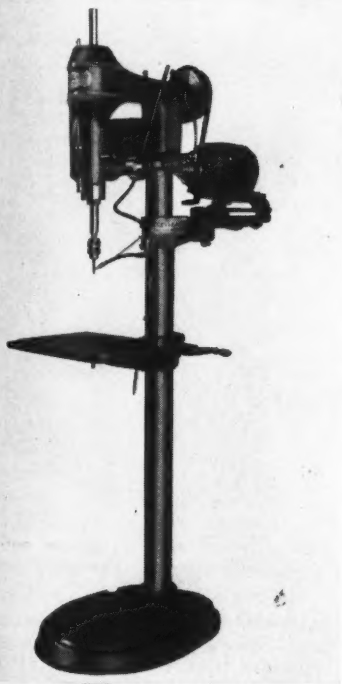
The lathe bed is of semi-steel; hea side walls with double walled cross gir add to rigidity. Gears in the qui change gearbox, quadrant, end gearing apron, and all feed mechanisms a accurately cut from forged steel blank A separate lead screw and feed rod a provided to maintain accuracy of scre which is in use only when cutti threads. A metric lead screw can b supplied if specified. Transposing gea including taper turning draw-in, turrets on ca riage or tool post, o pan, pump and piping follow rest, and ma others can be supplie if desired.

Specifications of th Simmons 16 and 18-i Model Lathes respectively are as follows: swing over ways, 17 in. and 1 in.; swing over carriage 11 in. and 13 in.; swing over compound rest, 1 in. and 11½ in. The following dimensions are the same for both models: distance between center (6-ft. bed), 30 in. hole through spindle, 2 in.; taper of centers Morse No. 4; ratio first back gear, 4.4 to 1; ratio second back gear, 11.07 to 1; number of spindle speeds infinite; number of thread changes gearbox, 36; range of threads, U. S. S. 2 to 40; range of threads, metric, 1 to 20; range of feeds, 0.0116 to 0.232 in. lead screw threads per inch, 4; tailstock spindle traverse, 7½ in.; travel of compound rest, 6¼ in.; steady rest capacity 6 in.; size of lathe tool, ⅝ x 1⅝ in.

Weight, lathe crated (6-ft. bed), 16-in. Model, 3,300 lb.; 18-in. model, 3,500 lb. Standard equipment of the Simmons Micro-Speed Engine Lathe includes large and small faceplates, compound rest, thread chasing dial, two centers, tool post, steady rest, Simmons Micro-Speed Motor Unit mounted in leg, complete with starter, and a set of wrenches.

Cleveland No. B-2 Vertical Tapping Machine

A vertical, automatic, reversing tapping machine designated as the No. B-2 has been announced by the Cleveland



Cleveland No. B-2 Vertical Tapping Machine

Tapping Machine Co., 1725 Superior Ave., Cleveland, Ohio. Due to a fingertip control of the clutch, the machine, it is claimed, can be used to tap over 30 holes per minute. Capacity of the machine in steel is from 6/32 to ½ inch.

GIVE OPERATORS *Perfect Remote Control* of Switches, Valves, Clutches, and other Mechanisms *with*

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PUSH-PULL CONTROLS

• Push-Pull Controls operate easily, instantly and positively. They hold any position to which they are set. In many installations they permit the operator to change the point of control at will or as directed.

They do away with the noise and "sloppiness" and maintenance bothers of controls that employ toggles, bellcranks, rods, pins, springs and other such parts.

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The table of the No. B-2 machine is 12 x 16 in. in size and is of rugged construction, with a large oil trough, and can be easily adjusted for height by rack and gear. The table swings horizontally and has a vertical movement of 34 in. The clutch of the machine is adjusted by a lever at the operator's finger tip. It is mounted on the drive shaft and revolves constantly in one direction. Construction and design of the clutch is the same as used in automobiles.

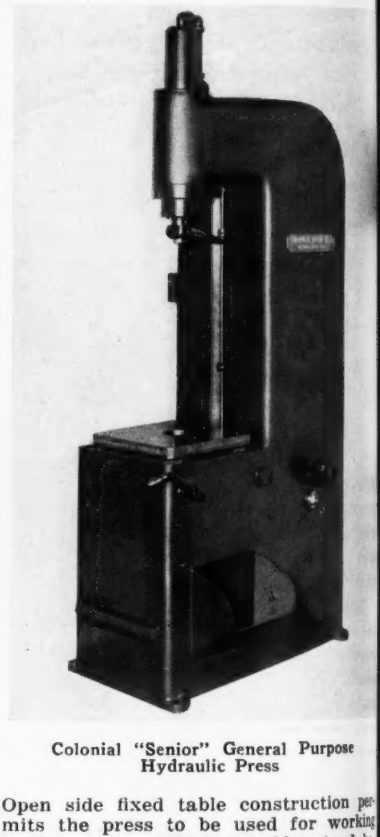
The spindle of the machine revolves on ball bearings within a 2-in. quill, accurately machined. Thus, vibration and wear are said to be at a minimum, and the spindle is said to remain very rigid after long use. Lubrication is applied directly to the tap by an oil line. The amount of flow is controlled by a valve incorporated in the oil line, and the flexible spout of the line enables the flow of oil to be directed to any point desired. Speeds of the No. 2 machine are 260, 345, 560, and 870 r.p.m., and may be changed as desired by changing the four-speed pulley on the motor.

The Cleveland No. B-2 Vertical Tapping Machine is supplied equipped with a ½ h.p. motor, adjustable oiler, No. 2 Morse taper in spindle, motor mounted on floating base, V-drive belt, depth gage, production table, and table-raising mechanism, ready to use. Specifications of the machine are as follows: Morse taper, No. 2; traverse of spindle, depth gage off, 4 in.; traverse of spindle, depth gage on, 3 in.; vertical traverse of table, 32 in.; dimension of table, 12 x 16 in.; largest tap machine will drive efficiently, ½-in.; distance column to center of spindle, 9 in.; diameter of spindle, 1 in.; diameter of spindle sleeve, 2 in.; diameter of column, 3¼ in.; capacity in steel, ½ in.; maximum height, 76 in.; motor, ½ h.p., 1.750 r.p.m.; speeds, 260-345, 560, 870 revolutions per minute.

Colonial "Senior" General Purpose Hydraulic Press

A line of general purpose hydraulic presses for use in assembling, broaching, and so on, is announced by the Colonial Broach Co., 147 Jos. Campau, Detroit, Mich. Designated as the "Senior" line, the presses range in capacity from 1 to 10 tons, with strokes ranging from 18 to 42 in. Complementing them, the "Junior" line of Colonial presses previously announced covers the light-duty press field.

According to the manufacturer, the Colonial Senior Press is designed for maximum flexibility of operation regardless of the type of application for which it may be required, and inasmuch as the motor is located within the column, the press requires a minimum of floor space.



Colonial "Senior" General Purpose Hydraulic Press

Open side fixed table construction permits the press to be used for working on long parts which would extend beyond the machine table. The manufacturer further states that a large amount of daylight is provided in the press to allow for large fixtures, without sacrificing stroke. The work plate is removable for machining of special clearance holes as required.

The frame of the Colonial Senior Press is of rugged reinforced construction throughout, and the cylinder bearing is



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Die-sinkers, model makers, delicate-instrument parts finishers can do their best work only when their supplies of small files are *right for the job*—in shapes, sizes, cuts and *quality*.

Therefore, it is only logical that where speed and efficiency are the watchwords, industrial managements should turn to the world's largest file maker when stocking these important tools. For *precision files require the precision manufacture which only long experience and ample facilities can assure.*

Nicholson X. F. Swiss Pattern files are made to highly exacting standards. Points are smaller, tapers are longer and cuts are finer than in the conventional "American Pattern" files for similar purposes. Cleaning out, burring, enlarging small holes, shaping and finishing extra-narrow grooves, slots, notches and key-ways are more readily accomplished.

The automotive, aircraft, die-making and industrial-arts industries use Nicholson X. F. Swiss Pattern files extensively. Assortments are wide, designs are correct, and satisfactory performance is assured under the Nicholson broad guarantee of *Twelve perfect files in every dozen.*

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● *Five popular shapes of Nicholson Die-sinker files in Swiss Pattern designs and cuts are illustrated above. Free Technical Bulletin.*

NICHOLSON

X. F. SWISS PATTERN FILES

TRADE MARK
EXTRA X. F. FINE

located in the neck of the frame to eliminate unsightly protrusions. The cylinder is of leakproof steel tube construction. An integrally welded flange transfers working thrust directly from the working cylinder to the frame.

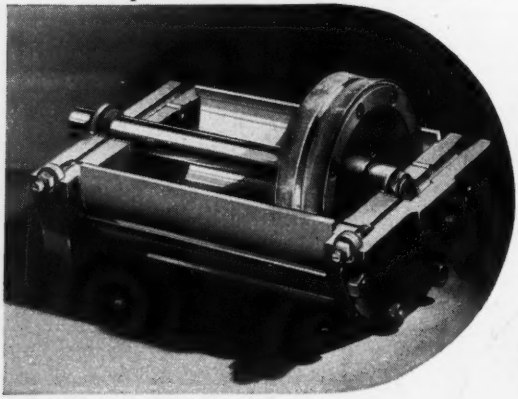
For economic replacement, standard hydraulic pump and equipment are employed in the Senior press. The pump is of large capacity and is direct motor driven. Located within the oil tank, the pump has exceptionally short suction, a feature which is said to add to the pump efficiency. The large size oil tank ensures cool oil for the hydraulic system. Large coolant flow where required, such as for broaching, is provided through the use of an oversize centrifugal pump which is positioned on the base of the machine and is driven by a separate motor. Chips are removed while the machine is in operation by means of generously sized chip troughs in the side of the column.

The Colonial Senior General Purpose Hydraulic Press can be furnished with controls to stop operations at top or bottom of piston stroke or with an automatic return after the piston has completed its downward travel. A special hydraulic circuit is available which permits the use of shuttle type fixtur desired, to speed up unloading and l ing (during the return stroke), w assuring maximum safety to the op tor. The Senior press is available seven sizes of 1-ton, 18-in. stroke; ton, 18 or 24-in. stroke; 6-ton, 24 or in. stroke; and 10-ton, 30 or 4 stroke. Floor space of the 1-ton m is 18½ x 30½ in. with 29 x 51 in. for largest model.

Seybold Precision Knife Grin

A newly designed Seybold Preci Knife Grinder — a high speed mach with automatic grinding wheel feed centrifugal pump cooling system—is nounced by the Seybold Division, Ha Seybold-Potter Co., Dayton, Ohio. moving an absolute minimum of m the grinder is said to quickly prod a keen, true cutting edge that requi little honing. According to the ma facturer, the unit does not require experienced operator and grinds equi well shear blades or beveled knives as planer, chipper, hog, barker, ven paper, rag, granulating, tobacco, scraper or doctor blades.

adjustable "cushioned" air cylinder strokes



The action of the cushioned p of an air cylinder stroke depe on variables that are, at best, d ficult to determine. This con tion can be offset in part by h ing this cushion action adj able. Cushion adjusting scre operate to "slow" or increase speed of the cushion action.

Furnished as standard equipm on T-J Cushioned Air Cylinde these screws may be readily *justed and locked in position the job.* Write for catalog 36-A the Tomkins-Johnson Co., 620 Mechanic St., Jackson, Mich

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ADJUSTABLE Boring Blocks offer an economical method for boring two or more diameters in line. The final test of the economy is the alignment and concentricity of the finished bores. If you use McCrosky Bars, you can be sure the McCrosky Centralizing-V Lock will locate and lock the blocks in the bar with on-the-nose accuracy, and will bring the blocks dead central again after removal for regrinding.

McCROSKY TOOL CORPORATION

Meadville, Pa.

McCROSKY ADJUSTABLE BLOCK BORING BARS





Seybold Precision Knife Grinder

A unique feature of the grinder is a hollow three-sided knife bar, each surface of which presents a different series of angles to the action of the traveling grinding wheel. A fourth open side enables various types of blades to be easily clamped or bolted to the bar. On the surface of the knife bar where most of the grinding of paper cutting knives is done, the stud-nut principle for fastening the clamps is retained. This arrangement is said to give a definite position for the clamps and permit uniform spacing.

In designing the improved Seybold Precision Knife Grinder, special consideration was said to have been given to shear blade grinding. Shear blades of a variety of sizes and up to 6-in. widths can be accommodated and satisfactorily ground on the unit. The adjacent surfaces of the knife bar are made to accommodate almost all straight edge knives that are in general use.

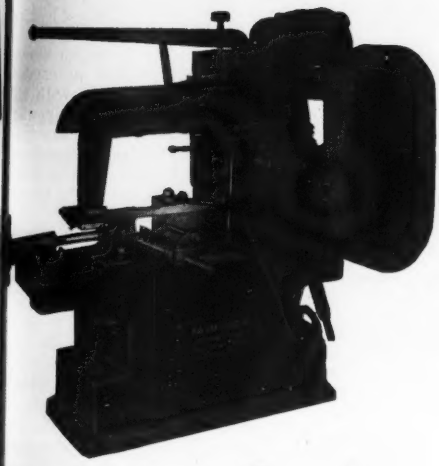
All gears and clutch operate in an oil bath to insure quiet, trouble-free performance. Only the floor space occupied by the base is said to be required for operating the unit, and, according to the manufacturer, adjustments and controls are so simple and easy that the machine can be handled by any intelligent workman. The Seybold Precision Knife Grinder is made in three standard sizes; namely, 70, 100, and 128-in. lengths.

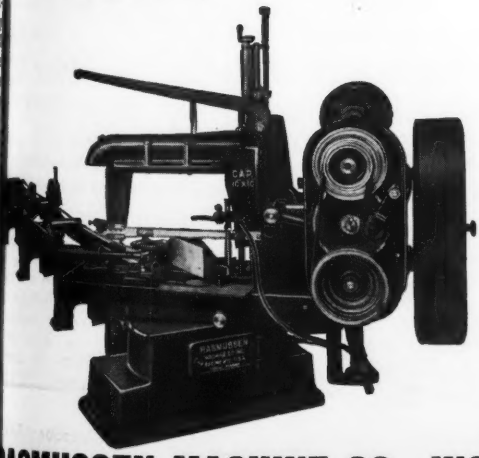
Simmons No. 2 Micro-Speed Turret Screw Machine

Illustrated herewith is the Simmons No. 2 Micro-Speed Turret Screw Machine which has been brought out by the Simmons Machine Tool Corp., 178 Broadway, Albany, N. Y. One of the principal features of the machine is the Simmons Micro-Speed Drive Unit which is built into the cabinet leg.

According to the manufacturer, the micro-speed drive unit provides an unusual advantage in the very flexible range of selective spindle speeds obtainable. When applied to the turret screw machine as shown in the illustration, the drive unit enables the operator to select immediately the speed best suited for the spindle, dependent upon the class of stock that is being machined. The unit is said to give an infinite range of spindle speeds by the turn of a handwheel located within







"Saw More"

HEAVY DUTY—HIGH SPEED METAL CUTTING MACHINES

"Saw More" 4-Speed Gear Box Transmission

With 12 foot automatic bar feed.
Motor Driven.
MANUFACTURED IN
2 Sizes — 6" x 6" and 10" x 10".
Either with or without automatic bar feed.

"Saw More" 3-Speed Silent "V" Belt Transmission

Without automatic bar feed.
MANUFACTURED IN
2 Sizes — 6" x 6" and 10" x 10".
Either with or without automatic bar feed.

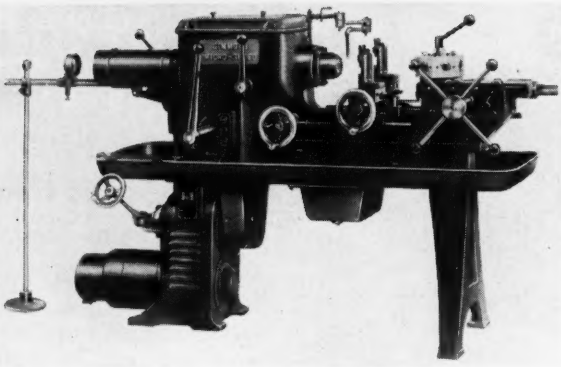
"Saw More" Swiveled

All "Saw More" Machines

swivel on base to 45 degree for angle cutting.

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PROMPT DELIVERY
Ask your dealer or write direct for circular.
MANUFACTURED BY

RASMUSSEN MACHINE CO., INC. 9 Main St., Racine, Wis., U. S. A.



Simmons No. 2 Micro-Speed Turret Screw Machine

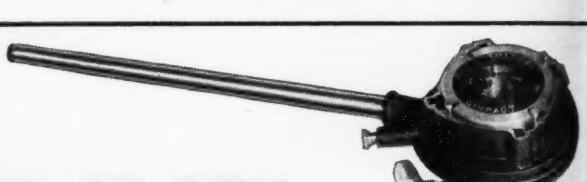
bers are accurately ha scraped. Levers are l cated within immedia reach of the operato The head is cast sol with the bed to ensu greatest possible rigid ty. The spindle is high carbon steel, accu rately ground to size. long lever is provided o the headstock for ope ating the automati chuck and bar feed, gi ing maximum leverag for closing collets. E tra collets can be fu nished for holding abo length work of greate diameter than the ca pacity through th spindle.

easy reach of the operator. An alternating current motor is built into the unit and is available in any voltage. The motor can also be supplied in single phase up to 3 h.p. on order.

The Simmons No. 2 Micro-Speed Turret Screw Machine is designed for rapid production. The spindle is mounted on Timken precision tapered roller bearings, and all bearings for sliding mem-

Each position of the hexagon turre is controlled by independent adjustabl stops. The turret is provided with si tool holes arranged to hold tools wi or without shanks. Bolt holes are pr vided for fastening tools to the fac of the turret, and a lock bolt is pos tioned at the front of the slide unde cutting tool.

The cut-off device of the machine



ONE SET OF DIES

THREADS 1", 1¼", 1½", 2" PIPE

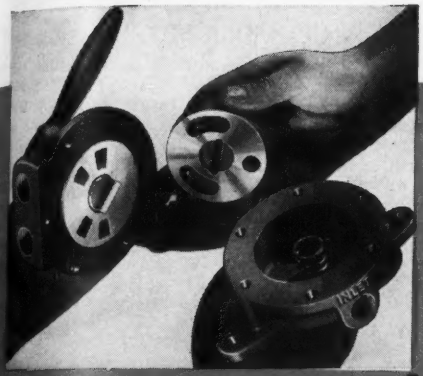
—with a "TOLEDO" SIMPACT Ratchet Threader.

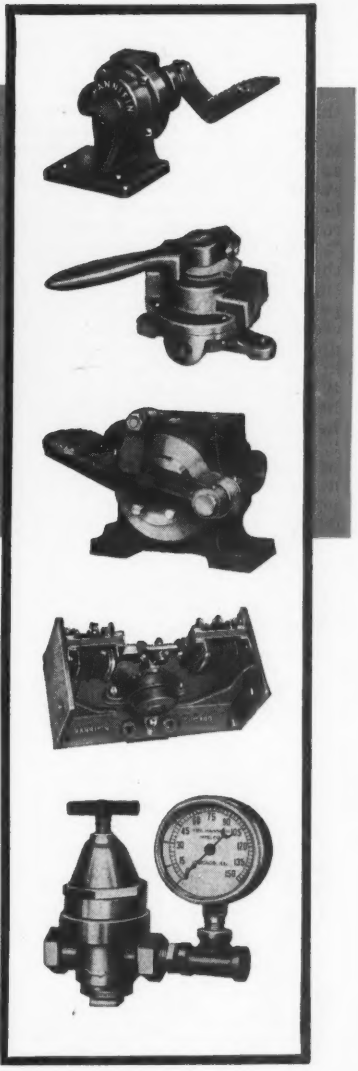
Dies are high speed steel and may be resharpened many times. Sizes are changed quickly with the finger tips. Automatic drip oiling. 24" tubular handle. Easier operating than other self-contained stocks. Adjustable rear guide is easy and quick to center. Minimum number of parts assuring long life. Easy to clean, assemble or disassemble. You will like this new "TOLEDO" threader. Order from your dealer today.

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Hannifin Air Control Valves are made in 3-way and 4-way types for all standard control cycles, hand and foot operated, spring return, heavy duty rotary, manifold, and electric remote control models, for control of all types of air operated equipment.

Also piston type pressure regulating valves to furnish uniform, economical operating pressure for individual machines.

Write for Valve Bulletin 34-MM with complete listings of all types.

HANNIFIN MANUFACTURING COMPANY
621-631 South Kolmar Avenue, Chicago, Illinois

HANNIFIN "Packless" AIR CONTROL VALVES

operated by a lever, although a screw feed can be furnished. Two tool posts of different heights are furnished. A geared oil pump provides lubricant to work through an adjustable piping system.

Specifications of the Simmons No. 2 Micro-Speed Turret Screw Machine are as follows: swing over bed, 14 in.; swing over cross slide, 6 in.; width of bed, 7 in.; automatic chuck capacity, round, 1 in.; square, 11/16 in.; hexagon, ⅞ in.; hole in plunger, 1/32 in.; hole through spindle, 1¼ in.; diameter threads spindle nose, 2⅜ in.; threads per inch, 8; spindle speeds, 56 to 720; cross slide travel, 5 in.; hand longitudinal travel, 12 in.; diameter tool holes in turret, 1 in.; size of tapped holes in turret faces, ⅞ in.—14; center of tool holes to top of slide, 2⅜ in.; size of hexagon turret across flats, 7¼ in.; turning movement turret at one setting of saddle along bed, 6 in.; maximum distance spindle to turret face, 18 in.; power feeds per revolution of spindle, 0.006, 0.010, 0.018; net weight, 1,600 lb. An oversize spindle may be supplied on order to provide automatic chuck capacity for 1¼ in. round, with 1 5/32-in. hole in plunger and 1½-in. hole through spindle.

Oster No. 502 "Pipemaster"

A recent addition to the line of po table pipe machines manufactured b The Oster Manufacturing Co., 2061 E 61st St., Cleveland, Ohio, is the Oste No. 502 "Pipemaster" shown in th illustration herewith. This model round out a line of ¼ to 2-in. pipe machines

Equipped with a sliding, floating typ of die head which is adjustable an quick opening, the machine follows th modern trend of pipe machine design The die head is "front-cutting," a fea ture which together with the "close gripping" design of the front chuc enables the machine to handle nipple as short as 3½ in. in the 2-in. size without the use of a special nippl chuck. A cone fluted reamer of scientif design is mounted on the front of th die head and is integral with it. A con struction of this type is said to enab the operator to handle close work easil and efficiently.

The cut-off device of the Pipemaste uses standard cutter wheels and rol ers. The device is of all steel construc tion, thereby making it extremel powerful for quick cutting-off, and i said to be practically unbreakable.



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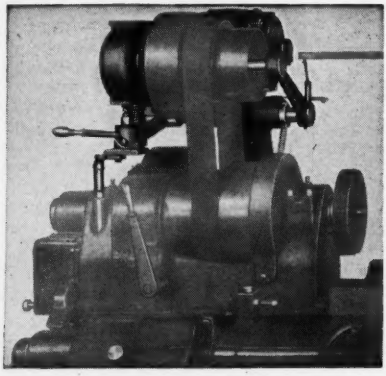
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Cullman Drives

Your Lathes, Shapers, Milling Machines and other belt driven machines can now be easily motorized with direct drives.

Cullman Drives are rigidly constructed, easily installed and simple to operate.

Made for motors from ¼ to 15 H.P.

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1336 Altgeld St., Chicago, Ill.

A carriage which floats on all ... ways permits the die head and ... to conform to irregularities in ... thereby prolonging the life of the ... head and dies. The carriage, which ... fed by a hand lever, can be remov... quickly to lighten the carrying weig... of the machine, if desired.

To assist the front gripping chuck ... centering long lengths of pipe, the m... chine is equipped with a three-jaw c... tering chuck on the rear of the spind...



Oster No. 502 "Pipemaster"

A thread length gage which can be ... to ensure duplicate, standard leng... threads is also a part of the regu... equipment of the Pipemaster. An ... pump, which is geared directly to ... motor and has an adjustable re... valve, supplies an abundant flood ... cutting oil to the dies.

The Oster No. 502 Pipemaster is p... ered by means of a ½ h.p. Black ... Decker, universal, reversible, varia... speed motor which can be operated fr... an ordinary electric light socket. T... Pipemaster is 46 in. in overall leng... 19½ in. wide, and 18 in. high. ... weight complete, 280 lbs.; with carri... removed, 215 pounds.

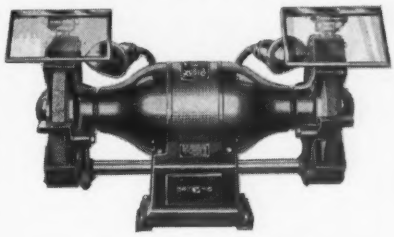
Ideal NAIEC Speed Lathe

Designed especially for light finish... operations such as burnishing, lapp... burring, or polishing of small parts, ... speed lathe shown in the illustration ... been developed by the Schauer Mac... Company, 2060 Reading Road, Cincin... Ohio. The design and construction of ...

FOR LONG FAITHFUL SERVICE

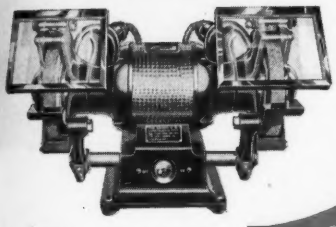
EQUIP WITH

SIOUX BENCH GRINDERS



SIOUX 10-inch BENCH GRINDER

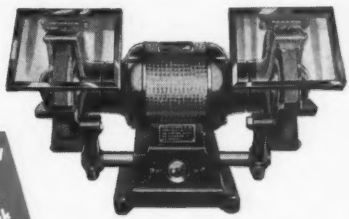
No. 2050 — heavy duty, completely equipped. Enclosed guards with 6" x 8" shatter-proof safety eye shields. Spark guards and tool rests adjustable for wheel wear. Conveniently located lights with shades. Two grinding wheels, fine and coarse. Motor rating 1725 R. P. M. — ¾ H. P. Pedestal available.



SIOUX 8-inch BENCH GRINDER

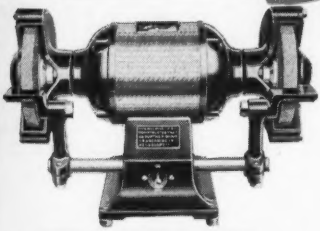
No. 2024 — heavy duty, equipped with lights and shades. Motor rating 3450 R. P. M. — ½ H. P.

A SIZE FOR EVERY NEED
Priced to Fit Every Pocketbook



SIOUX 7-inch BENCH GRINDER

No. 2035 — heavy duty, with enclosed type guards and safety eye shields. Motor rating 3450 R. P. M. — ½ H. P.



SIOUX 6-inch BENCH GRINDER

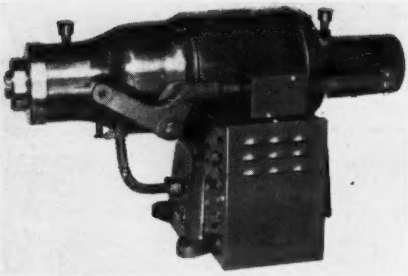
No. 2005 — heavy duty, dust proof. Motor rating 3450 R. P. M. — ¼ H. P.

Smooth, steady operation year after year—because SIOUX grinders are correctly designed, precision machined and carefully assembled. Ball bearings oil packed and sealed, requiring no further lubrication. Shop operators everywhere have a word for QUALITY in power tools —it's *SIOUX!*

Ask the SIOUX Distributor for a demonstration or write for further information.

STANDARD THE WORLD OVER

ALBERTSON & CO., INC. SIOUX CITY, IOWA, U. S. A.



Schauer Ideal NAIEC Speed Lathe

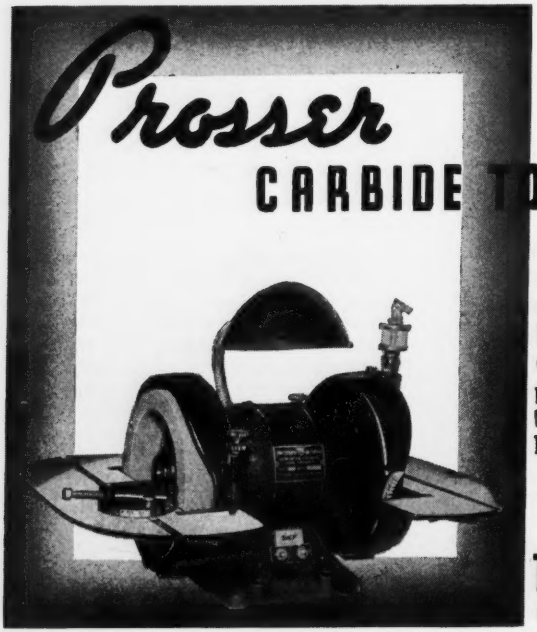
lathe is such that the operations for which it is intended can be performed with the maximum of efficiency, thus releasing heavier, more expensive machine tools for the heavier manufacturing tasks.

The feature of the machine is the continuous motor operation, delivering high speeds to the lathe spindle. The collet and spindle are magnetically controlled and are engaged or disengaged by foot treadle operation. Special built-in features are available to handle rods, tubes, and stock parts with a high degree of efficiency.

Univertical High Speed End Milling Machine

A high speed vertical milling machine having a swivel head graduated to a range of 90 deg. either side of the perpendicular is announced by J. D. Duff & Son, 544 Insurance Exchange Bldg., Detroit, Mich. Designated as the Univertical, the machine is rugged, compact and powerful, and can be used for milling, drilling and boring. It is especially adaptable for contour milling. The Univertical mills an 8 x 16-in. die at one setting and is designed for use with cutting tools up to ⅝ in. It can also be adapted to small grinding operations.

A bench-type machine with a base 11 x 17 in., the Univertical is powered by a heavy duty ¼ h.p. motor and has a four-speed V-belt pulley which permits a range of from 850 to 3,400 r.p.m., thus handling a broad latitude of intricate milling. The overall height of the spindle is 37 in., and the maximum lift of the table to the end of the spindle is 10 in., with a work clearance of 6½ in. from the center of the spindle to the rugged supporting column. The table, which is 24 x 4⅞ in. in size and is provided with T-slots, has a cross travel of 17 in. and a forward and back



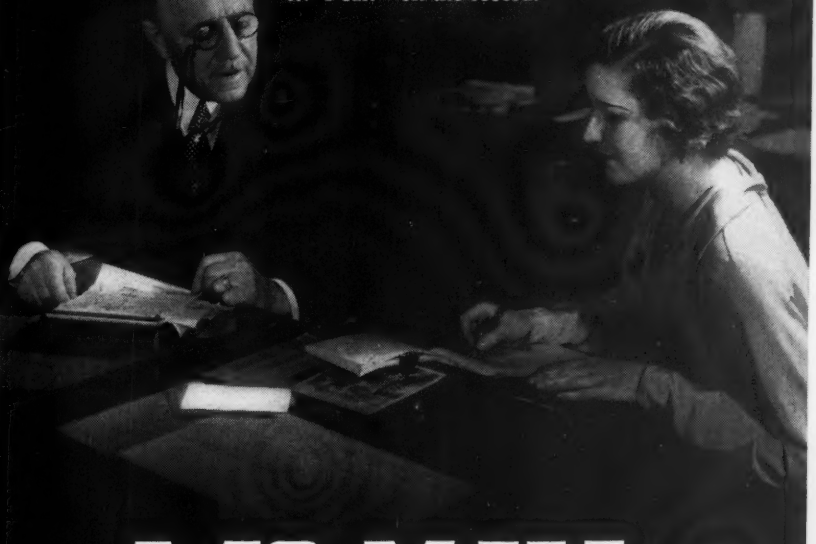
• Removes metal fast when rough grinding.
• Finish grinds smooth, keen cutting edges.
• This grinder will quickly pay for itself by increased tool performance and life between grinds.

$97.50
10 DAYS FREE TRIAL
Write for complete details

Thomas Prosser & Son
120 WALL ST. NEW YORK

MO-MAX makes high speed tools average twenty per cent higher in efficiency, and you may quote me.

NO matter what other brands of high speed steel you are now using, I recommend that you try tools made of MO-MAX. They will average twenty per cent higher in efficiency. I was embarrassed when asked why it had taken me six years to investigate. That's off the record. But I do know that it pays to shift to MO-MAX for quality and quantity production. Perhaps you too know that, but can you prove it? I can—on the record.



MO-MAX

TRADE MARK REG. U. S. PAT. OFF

MOLYBDENUM-TUNGSTEN HIGH SPEED STEELS

Leading steel companies can supply you with their licensed brands of MO-MAX. For booklet with technical data and sources of supply, write The Cleveland Twist Drill Company, Cleveland, Ohio.

220

SIMONDS
Red Tang
FILES

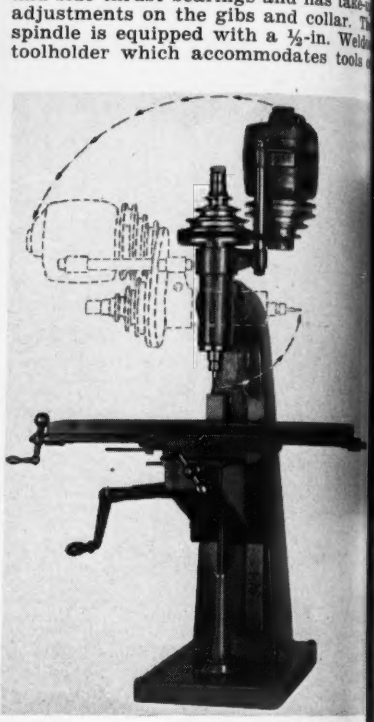
TEETH LIKE A METAL SAW
•
CUT FASTER LAST LONGER

Ask
Your Dealer
Simonds
Saw & Steel Co.
Fitchburg, Mass.

SIMONDS
Famous Family of
METAL CUTTING TOOLS

travel of 7 in., with all movements gra uated to 0.001 inch.

The spindle of the machine is set in e and side thrust bearings and has take- adjustments on the gibs and collar. T spindle is equipped with a ½-in. Weld toolholder which accommodates tools



Univertical High Speed End Milling Machine. Dotted Line Indicates How Swivel Head Ca Be Swung to 90 Deg. Either Side of the Perpendicular.

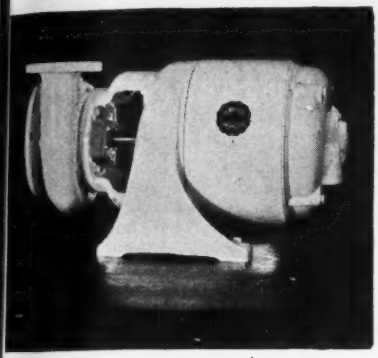
from ¼ to ⅝ in. in diameter. All move ments are checked to 0.001 inch.

According to the manufacturer, th Univertical Miller is perfectly balanced and is without vibration. Smooth opera tion and low maintenance cost are said t ensure efficient and dependable work.

U. S. Varidrive-Synchrogear Units

In order to provide small and com pact motors to manufacturers requiring units of this type, U. S. Electrical Mo tors, Inc., 200 E. Slauson Ave., Los Angeles, Cal., has developed and added

he types VEV-GD and VEV-GT motors to its Varidrive line. The motors are of the Varidrive speed design with double reduction and triple reduction gears for low speed drives. In the construction of the motor, a sub base for mounting the Varidrive and Synchrogear as a unit is not required, consequently the construction of the newly designed motors is much lighter and more compact than that of the motors



U. S. Varidrive-Synchrogear Unit

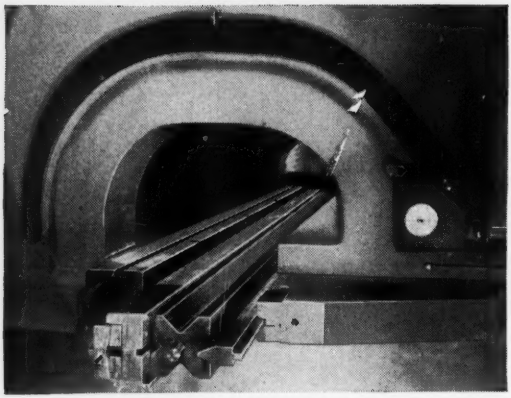
previously marketed. Further modification of the old design permits the Varidrive case to be mounted at any angle with respect to the gear case. If a unit is to be mounted where headroom is low, the Varidrive case may be laid over on its side or at an angle.

According to the manufacturer, the pyramidal gear pedestal is characteristic of the rugged design of U. S. Synchrogear Motors, providing both a rigid mounting for the Varidrive case and a sturdy Synchrogear motor capable of withstanding the heavy torsional stress resulting from heavy loads at low speeds. The tooth surfaces of gears in all U. S. Synchrogear Motors are hardened to 55/65 Sclerescope, thereby providing a high standard of surface hardness that is said to give long life to the geared unit.

Tonnage Indicator for Steelweld Bending Presses

A tonnage indicator for Steelweld Bending Presses has been developed by the Steelweld Machinery Division of The Cleveland Crane & Engineering Co.,





Tonnage Indicator for Steelweld Bending Presses

Wickliffe, Ohio. The indicator is designed to keep both the operator and management informed of the loadings to which a press is subjected and gives warning when dies become worn. It also indicates when a press is being over-bottomed.

The indicator has two pointers, namely, the "Job" pointer which registers the tonnage for the individual job being worked on a press, and the "Maximum Load" pointer which indicates the maximum load at which the press has ever been operated. The "Job" pointer remains at the highest tonnage reading developed by any of the operation of the job, and may be reset to zero reading at any time. Once set, the indicator requires no further adjustment.

New Housing Unit Applied to Johnson No. 550 Furnace

The Johnson Gas Appliance Co., [illegible] E Ave., N. W., Cedar Rapids, Iowa, is announcing a new housing unit for its No. 550 pot-hardening and melting furnace for non-ferrous metals. The standard furnace is now built to the floor instead of having legs, thereby making the furnace more substantial and at the same time enabling the furnace and its surroundings to be kept clean more easily.

WELDON "YESTERDAY'S PIONEERS TODAY'S LEADERS"

END MILLS



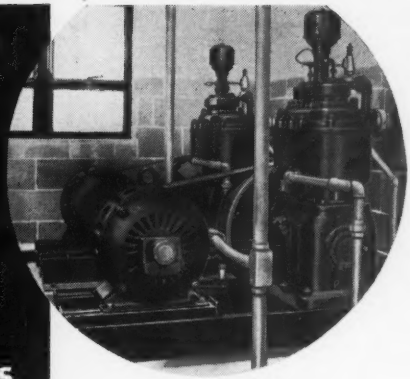
AGAIN WE PIONEER IN MAKING THIS HERETOFORE SPECIAL ITEM ONE OF OUR STOCK PRODUCTS. NEARLY A QUARTER OF A CENTURY OF EXPERIENCE MAKING CUTTING TOOLS INSURES THE QUALITY OF OUR PRODUCTS.

•

COMPLETE LISTING OF ALL OF OUR STOCK ITEMS IS IN OUR No. 8 CATALOG—IT IS YOURS FOR THE ASKING. SEND FOR IT TODAY.

THE WELDON TOOL CO. • 3000 Woodhill Road, Cleveland, Ohio

LOWER Your Costs for Air with CURTIS MODEL "C" Air Compressors



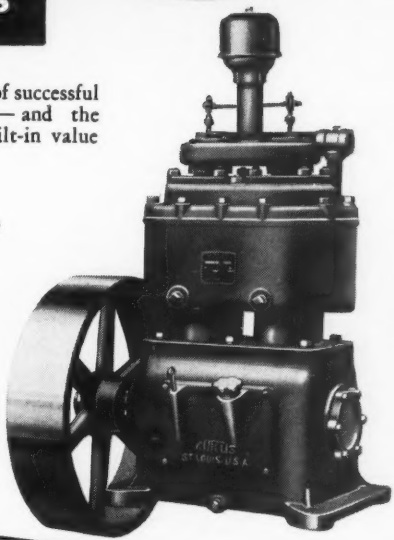
Every Curtis Compressor reflects Curtis' 86 years of successful engineering and manufacturing experience — and the result is the advanced engineering and honest built-in value that offers you:

Maximum capacity per dollar of first cost
Highest volumetric and mechanical efficiency
Maximum actual air delivery per unit of power input
Lowest maintenance expense and oil consumption

And actual operating records prove the fact that Curtis Compressors deliver dependable air service at minimum cost. With Curtis Compressors you can benefit in two ways — by replacing your present overloaded outworn and inefficient equipment and by extending the use of air operated equipment in your plant. More and more, air power is being used to operate modern equipment.

Curtis economy is the result of such design features as Timken Roller Bearings, Carbon-free Disc Valves, Centro-Ring Oiling, Automatic Pressure Unloader, and Precision Workmanship throughout, with all parts readily accessible; furnished in capacities up to 360 cfm.

Let us send you proof of Curtis economy. Full information will gladly be sent upon request. Send coupon for booklet, "How Air Is Being Used In Your Industry."



CURTIS PNEUMATIC MACHINERY COMPANY
1913 Kienlen Avenue, St. Louis, Mo.

Please send me booklet "How Air Is Being Used in Your Industry."

Name.....

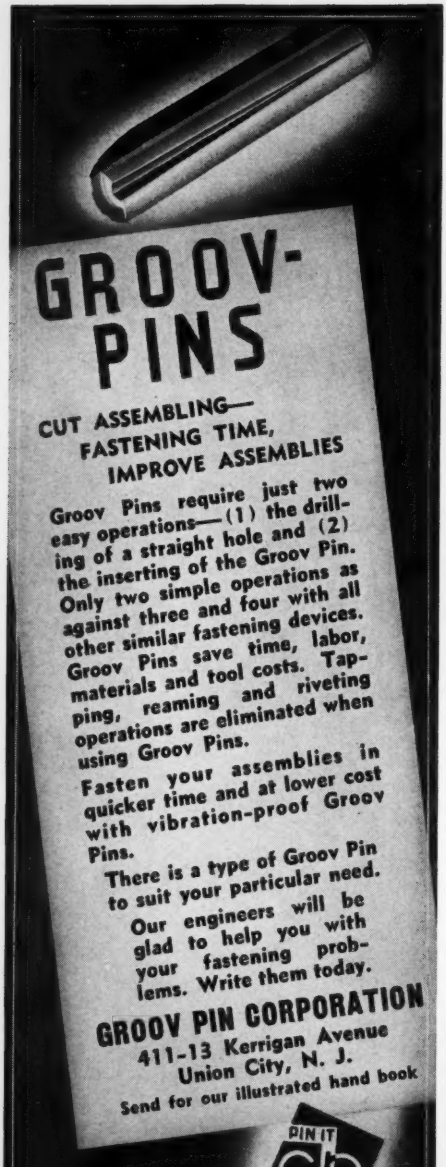
Firm.....

Street.....

City.....State.....

CURTIS

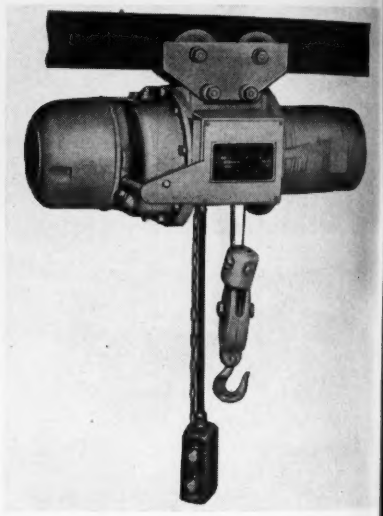
ST. LOUIS • NEW YORK • CHICAGO
SAN FRANCISCO • PORTLAND



The No. 550 furnace is designed especially for salt, cyanide, and lead-hardening and is said to eliminate the necessity of heating a large furnace for a few small parts. The unit is claimed to be especially convenient for use in small shops and is also said to find wide use by toolmakers and die-makers and small plants for case-hardening, as well as by patternmakers and modelmakers for melting small quantities of aluminum, brass, and nickel-silver.

Yale "Load King" Electric Hoist

A low-cost, air-cooled, wire-rope electric hoist designed to eliminate excess brake heat and permit heavy duty cycles, to be known as the "Load King,"



Yale "Load King" Electric Hoist

is now being manufactured by the Philadelphia Division of The Yale & Towne Mfg. Co., Philadelphia, Pa. The hoist is made in ¼- and ½-ton capacities and is available in three types; namely, lug, hook, or plain trolley, with a choice of either right angle or parallel suspension. Other features of the hoist are said to include maximum ruggedness and strength; simplicity of design, operation and maintenance; standardized interchangeability of repair parts; small overall dimensions; maximum use of ball

STOP YOUR BOLTS, NUTS AND SCREWS FROM LOOSENING *with* EVERLOCK WASHERS



U. S. PAT. NO. 1775705



Washer Tongue Detail

YOU can avoid the costly annoyance of loosened parts by using EVERLOCK WASHERS in your assemblies ... The powerful spring tension of every EVERLOCK WASHER tongue coupled with the bite of its teeth, does the job more thoroughly than other types of fasteners ... Pictured is an enlarged EVERLOCK tongue and a few of the different types that are used by the millions on a vast variety of products ... Service calls due to loosened nuts, bolts and screws on equipment where EVERLOCK WASHERS are used, is unknown ... There's an EVERLOCK WASHER of the correct type and size for every purpose.

Immediate Deliveries

OFTEN OTHER WASHERS HAVE BEEN TRIED, NOW EVERLOCKS ARE SPECIFIED

PRINTED IN U.S.A.

THOMPSON-BREMER & CO. 1640 W. HUBBARD ST., CHICAGO, ILL.

or roller bearings, and high overall efficiency. These features, it is stated, tend to promote complete hoisting efficiency and speedy, safe, economical operation.

According to the manufacturer, tests show that for all practical purposes the "Load King" may be operated out-of-doors as well as inside.

Hannifin "Hy-Power" Hydraulic Multiple Piercing Equipment

"Hy-Power" hydraulic multiple piercing units designed to permit punching or piercing of a large number of holes in structural members simultaneously prior to assembly of other parts by bolting or riveting are announced by the Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago, Illinois.

The 35-ton multiple piercing head is capable of piercing 5 holes in automobile frame side rail members; the holes are ⅝ and ¾ in. in diameter and the stock is ⅛ in. thick. Multiple heads are built to order to meet individual requirements of number and arrangement of holes to be pierced and stock to be handled. Any number of multiple heads required to complete the entire piercing operation in a single unit are mounted in a fixture designed to suit the work.

All multiple piercing heads for a given operation are driven simultaneously by a special multiple "Hy-Power" hydraulic pressure generator which provides hydraulic power and the automatic "Hy-Power" operating cycle for the entire unit. Control is by standard push button or foot pedal and the operating cycle is automatically completed as a unit "Hy-Power" equipment.

According to the manufacturer, multiple "Hy-Power" hydraulic piercing equipment meets modern production requirements where large numbers of holes must be produced in structural members, in accurate register for following assembly riveting, and with minimum handling.

Van Norman No. 2-S Horizontal Miller

The Van Norman Machine Tool Company, Springfield, Mass., has placed on the market the No. 2-S Horizontal Miller



ROTABIN AND PROFITS

GO AROUND TOGETHER

Rotabin means profits in your tool or stock room. Tools are made easily accessible and are kept orderly in their proper places. No time is wasted searching for a tool, a bolt, etc.

It's where you want it in Rotabin. Insure a smooth working and profitable stock room with Rotabin equipment.

Write. No obligations.

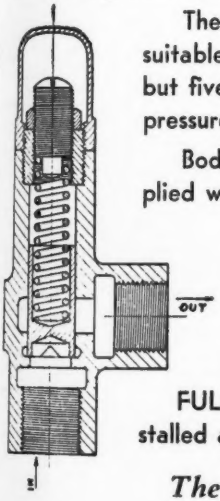
THE FRICK-GALLAGHER MFG. CO., Wellston, Ohio

TRADE MARK
FULFLO
REG. U.S. PAT. OFF.

NON-CHATTERING-- BYPASS PISTON TYPE OIL RELIEF VALVES

An important use of these modern valves is in connection with oil hydraulic pumping units, where a specific pressure is required to be maintained, especially on machine tool hydraulic mechanism, oil burning equipment, rams, presses, etc.

The cylindrical piston closes off the port in a shearing manner and does not seat abruptly against body of valve, thereby overcoming any pounding or chattering noise, ordinarily encountered with standard valves using disc seats.



They are made in pipe sizes from 1/4" to 2" and are suitable for pressures from 0 to 350 lbs., with a change of but five different springs for the pressure variation (state pressure required when ordering).

Bodies may be of cast iron or brass and can be supplied with brass, hardened steel or stainless steel pistons.

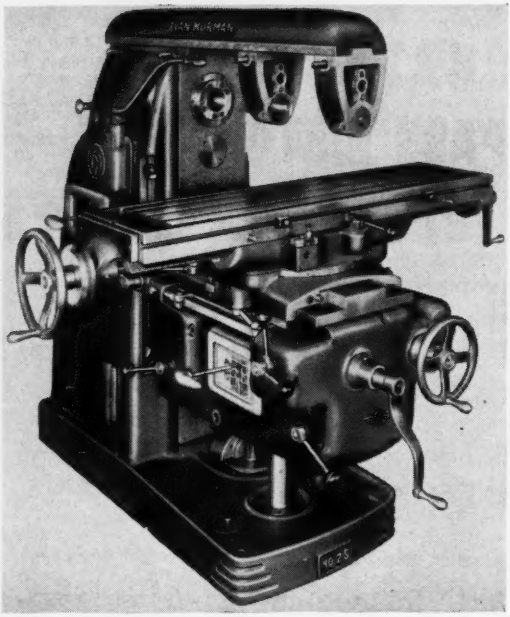
Where fuel oil is used we recommend a brass valve with stainless steel piston, due to the fact that fuel oil contains a certain amount of condensation and foreign matter, and a harder, non-corrosive piston is required.

FULFLO Valves require no attention after being installed and set for the required pressure.

The FULFLO Line also includes Centrifugal Coolant Pumps. May we send you bulletins?

THE FULFLO SPECIALTIES CO., INC.

BLANCHESTER OHIO



Van Norman No. 2-S Horizontal Miller

as a companion to the No. 2-L which was recently introduced.

The No. 2-S is available both in plain and universal type. It is designed, built, and powered for maximum metal-removing capacity. Eighteen spindle speeds from 25 to 1250 r.p.m. can be selected by means of a single lever. The 18 feeds which have directional controls both front and rear are selected in the same manner. The machine is equipped with power rapid traverse in all directions. The size of the table is 50 x 12 inches.

Oilgear Type "DX" Two-Way Variable Displacement Pumps for Remote Push-Button Control

Two-way, three-position, electric-controlled, variable displacement pumps are now being manufactured in conventional sizes from 2 to 150 h.p. by The Oilgear Company, 1401 W. Bruce St., Milwaukee, Wis. These heavy duty, radial, rolling piston type pumps utilize a high grade of oil as the finish power medium. Practically each size of pump is available with internal pumping mechanisms for normal working pressure ratings of 1,100, 1,700 and 2,500 lb. per sq. in. and for peak pressures up to 3,000 lb. per sq. in. All pumps are arranged for flanged mounting to a separate reservoir base or reservoir integral with the machine and are fully equipped with built-in auxiliary gear pumps for supercharging the high pressure unit, for operating the pump control mechanism, and for auxiliary purposes; built-in relief valve for the gear pump; dual built-in reverse flow high pressure adjustable relief valves for protecting the machine and pump against overload; two-way automatic suction and discharge valve flanged integral with the pump case, and flanged pipe connections.

By means of the compact, integral control on Oilgear Type "DX" Pumps it is possible to reverse the direction of oil flow and also to select the neutral position at will from a remote push-



- FAMCO -

ARBOR Presses

FOOT Presses

Scientifically designed, accurately machined from selected materials.

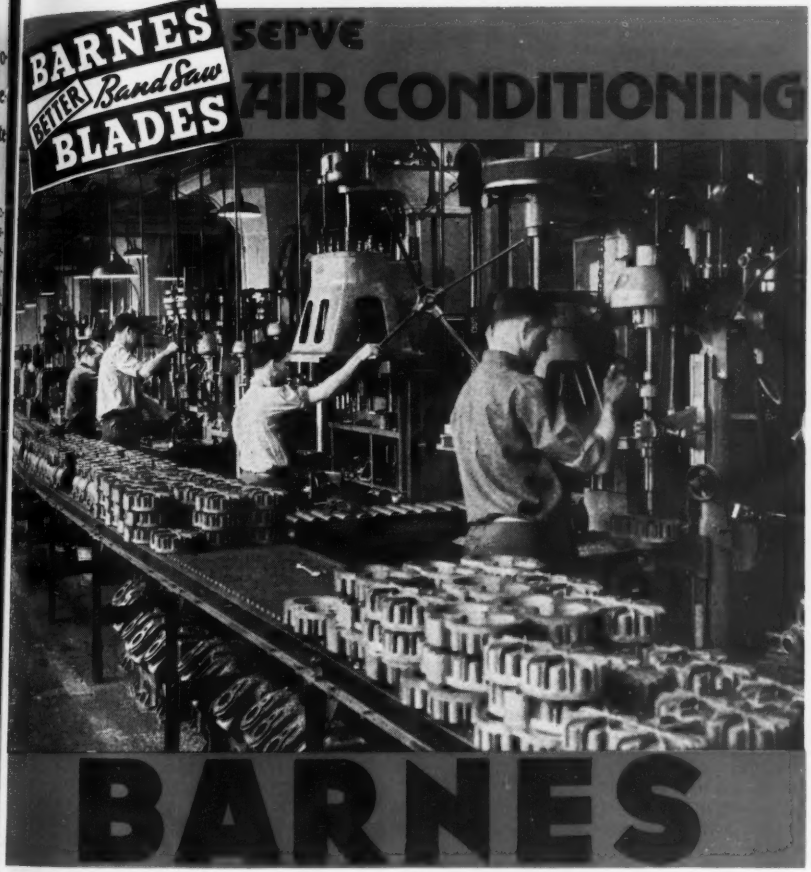
40 STOCK SIZES and MODELS (bench and floor types). Immediate shipment from stock.

Write for literature and prices.

FAMCO MACHINE COMPANY

1324 18TH ST. RACINE, WIS.





Lusty Infant

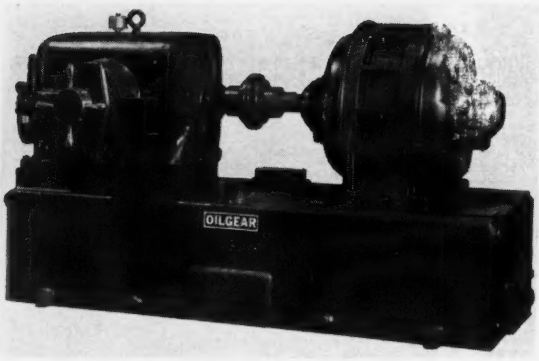
Only a few years old, Air Conditioning is one of the country's fastest growing industries. It manufactures and installs equipment for heating, cooling, humidifying, dehumidifying, cleaning and circulating air. It brings the whole world into the temperate zone.

In the plant and on the job it needs the best metal cutting equipment—uses Barnes Hack Saw Blades and Band Saws for accurate, low-cost cutting.

Barnes Metal Cutting Band Saws are used throughout the Air Conditioning Industry, where they are valued for their long life—their low cost per cut. Widths as narrow as $\frac{1}{16}$" do much of the industry's contour sawing and die cutting. Barnes Band Saw stock is now furnished in a tangle-proof package that keeps the coil always under control.

TRY Barnes Band Saws and Hack Saw Blades. Ask your mill supply dealer.

W. O. BARNES CO. INC.
DETROIT MICHIGAN



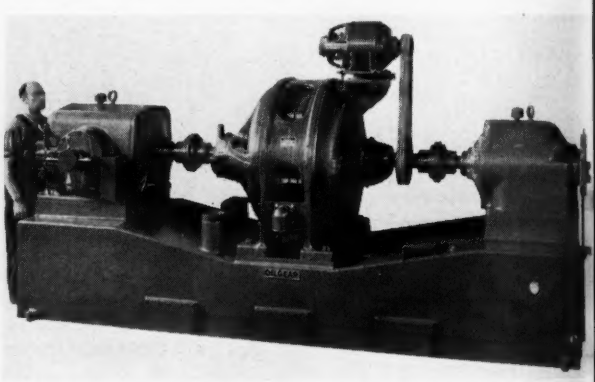
Oilgear Type "DX-10025" Pump

in. (71.4 gal.) per minute
either direction at pe
pressures up to 3,000 lb.
sq. in. No oil is deliver
when the pump operates
neutral.

The other illustrati
herewith shows an Oilge
Type "DX-15025" Pump
combination with an Oilge
Type "C-15025" Pump on
large reservoir base and d
rect connected to a doub
end 250 h.p., d.c. electr
motor. These units provi
a combined delivery of
000 cu. in (216 gal.) of
per minute at peak pre
sures up to 3,000 lb. per
in. for operating a
ton high speed hydrau
deep-drawing press having a 6
stroke.

Since Oilgear Type "DX" Pumps a
especially adapted for remote, finge
tip, push-button control and greatl
simplify the oil circuit and piping, the
are being used as standard equipmen
on all styles of Oilgear broaching ma
chines. The ease of operation, accurat
control of volume, smooth acceleration
and deceleration of oil flow, automati

button station or by means of switches. Two opposing solenoids mounted on the pump control operate a built-in pilot valve. When one solenoid is energized, a preset volume of oil is discharged in one direction. When both solenoids are de-energized, the pump slide block moves to neutral position and no oil is delivered by the pump. Hand control adjustments provided on each side of the pump permit the operator to preset the volume of oil to be delivered in either direction from zero to maximum. Since the flow of oil is reversed in the pump, no external control valves are required and the installation is greatly simplified. For example, when the pump is used in combination with a double acting cylinder on a hydraulic press, only two pipe lines are necessary to connect the pump and the cylinder.

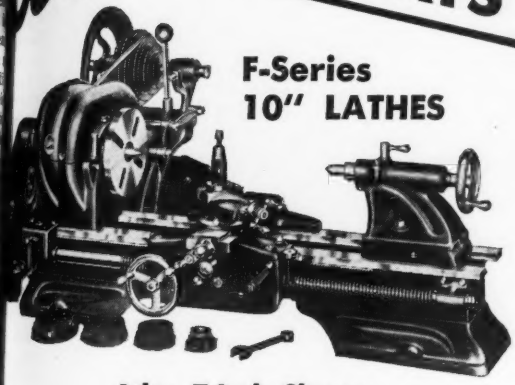


Oilgear Type "DX-15025" in Combination with an Oilgear Type "C-15025" Pump

One of the six Oilgear Type "DX-10025" Pumps recently built for operating large high speed presses is shown in one of the illustrations herewith. The pump is mounted on a large reservoir base and direct connected to a 75 h.p. electric motor. Oil delivered by the pump can be varied from 0 to 16,500 cu.

protection against overload, and automatic lubrication of working parts are said to make these units especially suitable for operating push-and-pull broaching machines, forming, assembling, forcing, broaching, extruding, and speed presses, and similar machines.

Atlas ENGINEERED FOR THE BUSY DAYS AHEAD



F-Series 10" LATHES

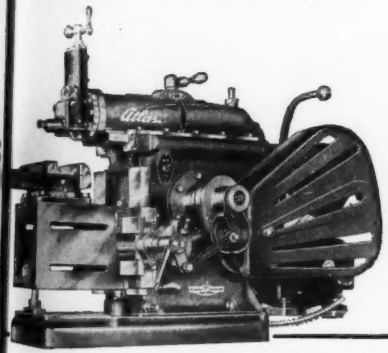
These Atlas Lathes meet the needs of the hour. They have the design, operating versatility, strength, and precision required for today's work in tool room and shop.

Features: Instantly reversible power cross feed, complete V-belt drive, precision-ground bed ways, custom-bored spindle bearings, quick-change countershafts.

Specifications: Swing over bed 10", over carriage 6⅝"; 16 spindle speeds—28 to 2072 RPM; cuts right or left threads 4 to 96 per inch (standard). 4 bed lengths available, capacity 18" to 36" between centers.

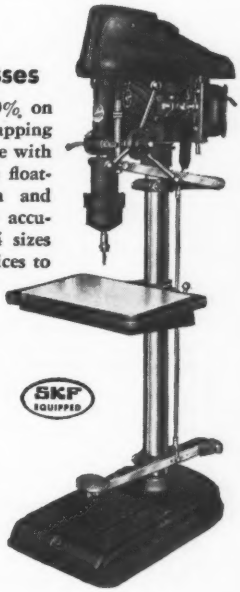
Atlas 7-Inch Shaper

Gives you speed and precision on all shaping jobs from ½" to 7" with only a ½ H.P. motor. Has crank-type ram-driving mechanism, complete V-belt drive, 4 speeds, 5 automatic cross feeds, adjustable countershaft, and many other features. Low priced. Get complete details.



Atlas Drill Presses

Savings as high as 60% on sensitive drilling and tapping operations are being made with Atlas Drill Presses. Atlas floating-drive spindle design and SKF bearings give long accurate service. There are 4 sizes to meet every need, 4 prices to suit every tool budget.



Send today for your copy of the Atlas Catalog. Gives you complete information and specifications on Atlas Lathes, Drill Presses, Shapers, Arbor Presses, Tools, and Attachments.

ATLAS PRESS COMPANY

1046 N. PITCHER ST., KALAMAZOO, MICH.

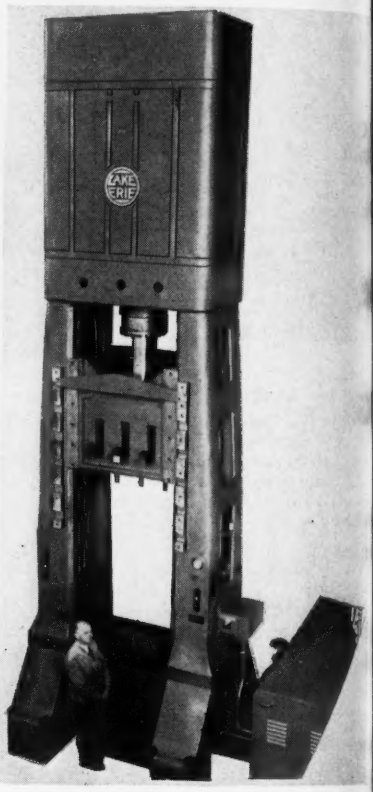
CHICAGO—35 E. Wacker at Wabash

NEW YORK—130 W. 42nd St. PHILADELPHIA—113 N. Third St.

Lake Erie 150-Ton Hydraulic Press

An unusually long stroke 150-ton hydraulic press especially designed for drawing cartridge cases has been built by the Lake Erie Engineering Corp., Buffalo, N. Y. According to the manufacturer, the press, with 108-in. daylight and a 76-in. stroke, is an interesting example of how hydraulic operation simplifies the design of a press for meeting unusual requirements.

The press has a solid housing with a gib-guided platen. Adjustable knock-out bars for types of work other than cartridge cases are provided, thus making the press an all-purpose unit. Conveniently located push buttons control inching, semi-automatic, and full automatic operation. Adjustable control of work-



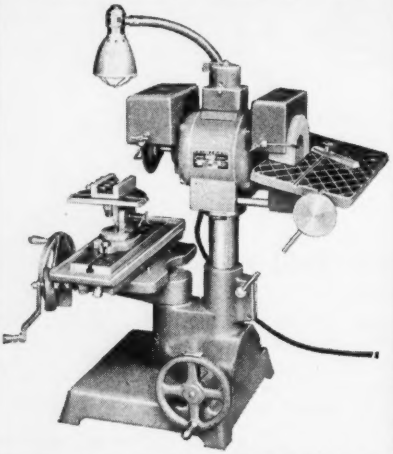
Lake Erie 150-Ton Hydraulic Press

ing pressure as well as length of upstroke and downstroke contribute flexibility to suit various operations and save die setting time on original and subsequent runs.

The top of the Lake Erie 150-Ton Hydraulic Press is completely enclosed in removable panels. A high speed pumping unit provides maximum production with fast approach and return of moving platen.

KNOCK-OUT Carbide Tool Grinder

A machine in a class by itself!



The Knock-Out Carbide Tool Grinder is designed for the complete maintenance of carbide tipped tools. Two distinct operations are necessary. The first is to properly sharpen the tool. The second is to correctly grind a chip breaker groove which requires a full universal machine with a vise adjustable for all angles. The special Knock-Out carbide tool grinder does both of these jobs rapidly and efficiently.

ASK FOR BULLETIN CTG 410M

K. O. LEE CO.
Aberdeen, So. Dak.
"practical tools for practical men"
KNOCK-OUT



Grasp the IN-tangibles too

Engineering departments have every facility for testing hollow screws, but no apparatus for testing the durability of Ideals or the permanence of high standards on the part of the manufacturer.

Let us remember that MEN give a product its character. They even give it *their* character, their integrity, their dependability. In *it* they reflect their own ability to "last".

A mere technical innovation may give temporary prominence to a new product. But consistent progress over many years proves a steadfast purpose to improve and perfect at all costs, — itself a guarantee that no work of today, however good, shall be good enough for tomorrow.

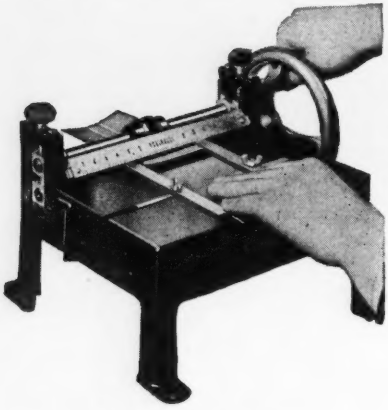
You may take the 30-year record of ALLEN as underwriting the integrity of a product which expresses nothing quite so much as the STRENGTH of our loyalty to your requirements.

Your local Allen Distributor will oblige with samples and SERVICE.

THE ALLEN MANUFACTURING COMPANY
HARTFORD, CONNECTICUT, U.S.A.

Ideal Insulation Former

A device that is said to form either plain or cuffed insulation of any length and up to 8-in. maximum width, to be



Ideal Insulation Former

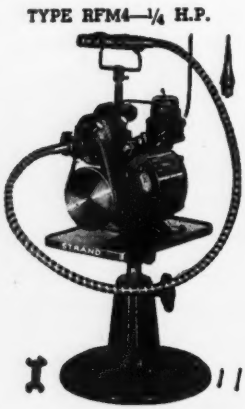
known as the Ideal Insulation Former, has been brought out by the Ideal Commutator Dresser Co., 1031 Park Av Sycamore, Ill. According to the ma facturer, the machine makes neat ting and uniform slot linings to sp up winding and to prevent burned armatures caused by winding beca torn when coils are tamped into pl

The Ideal Insulation Former is op ated by turning a handcrank while sulation is accurately guided betwee rubber roller and two creasing rollers two aluminum brackets. The rub roller protects the insulation and p vents the creasing roller from cutt through. Any desired width of tro up to 1½ in. may be obtained by adju ing the span between the two harde steel creasing rollers. The creasing ro er assembly is also adjustable for po tion of trough on insulation. Spri pressure between the rollers allows different thicknesses of insulation.

Strickland Precision Chip Breaker Grinder

Designed especially for precision d mond wheel grinding of chip breake in carbide cutting tools, the Stricklan

TYPE RFM4—¼ H.P.



Strand

Your Workmen Will Appreciate

STRAND *High Quality* FLEXIBLE SHAFT MACHINES

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Before you forget it, mail in the coupon below. It will bring you a handy assortment of Bristo Socket Screws,—the same kind of screws specified in so many manufacturing plants for superior holding power under every operating condition. Try them at our expense, on your own work, in your own way . . . that's all we ask.

SET TIGHTER . . . STAY TIGHTER

Thanks to the fluted socket head into which the wrench slips easily and locks snugly, you will find that a Bristo can be set up *tight*—and will hold, no matter what the service. Non-splitting, non-shearing, a Bristo Screw has more than enough strength for a *safe* set,—a set you can always depend on!

ACT NOW ON THIS OFFER

Give Bristos your *toughest* test. The free trial offer coupon brings these screws to you by return mail, along with a copy of informative Bulletin 83-BP. The Bristol Company, Mill Supply Division, Waterbury, Conn.



QUICK BRISTO FACTS

Lock-tight socket head,—won't split, shear, round out, jam or strip. Set tighter with less effort. No loosening under vibration. Take wrench without fumbling or skidding. **Designed by engineers for engineers.**

BRISTO
SOCKET SCREWS

THE BRISTOL COMPANY, Mill Supply Division
WATERBURY, CONN.

Send me sample Bristo Socket Screws in the following sizes _____
Also send me Bulletin 83-BP. (State Sizes)

Name _____

Address _____

Precision Chip Breaker Grinder shown herewith has been placed on the market by Engineering Service Inc., Box 4 Huntington Park P. O., Los Angeles Cal. The grinder is equipped with a universal quick setting ball joint vise wherein all angular positions of the cutting tool are said to be instantly ob-



Strickland Precision Chip Breaker Grinder

tained by setting the vise from direct reading, matching the degree graduations required.

Both vertical and traverse adjustments of the grinder are precision controlled by graduated handwheels. This method of control, in combination with the universal quick setting ball joint vise, is said to enable the operator to grind to exact dimensions the form of the chip breaker desired. Reciprocating longitudinal movement for grinding of cutting tools by diamond wheel is controlled by rocking motion of a handwheel located in a position convenient to the operator.

The Strickland Precision Chip Breaker

64 cuts—	4″ x 4″	#3115 steel
24 cuts—	3/8″ x 5″	#1020 steel
24 cuts—	7/8″ x 5″	#1020 steel
85 cuts—	4″ x 4″	#3130 steel
197 cuts—	*with very little wear in evidence*	



197
FAST, CLEAN CUTS
and still going Strong

There's another new customer using Blu-Mol molybdenum hack saw blades—and here's why:

This metal products maker had been contenting himself with about 100 cuts per blade . . . tungsten high speed steel cutting 5″ sq. stock. But then he tested Blu-Mol—Millers Falls' prize molybdenum blade, costing around 1/3 less than the tungsten. Blu-Mol's test record is shown in the table above —*197 cuts* so far, and *still* very little evidence of wear! That figures out to *over 60% saving in hack saw blade cost* through the change from high speed steel blades to Blu-Mol. You can bet we've made another regular customer.

Have us arrange a free trial of Blu-Mol on your own work. No obligation . . . write *today*.

MILLERS FALLS COMPANY
GREENFIELD, MASSACHUSETTS

MILLERS FALLS TOOLS SINCE 1868

Grinder is provided with a water reservoir and regulating valve which controls the flow of water so as to maintain constantly the proper degree of moisture to the diamond wheel. This construction, it is claimed, eliminates the possibility of an excessive supply of water splashing both the operator and the machine. The diamond wheel spindle is provided with precision ball bearings running at 3,450 r.p.m., thus giving the correct cutting speed for a 6-in. diamond wheel.

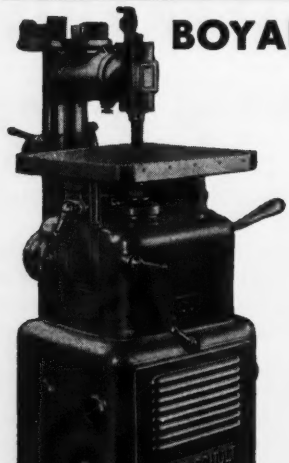
Specifications of the Strickland Precision Chip Breaker Grinder are as follows: longitudinal table travel, 12 in.; transverse table travel, 6 in.; vertical movement, 5½ in.; working surface of table, 5 x 12 in.; size of diamond wheel, 6 in.; net weight of grinder, 450 lb.; motor, ½ h.p., 60 cycle.

Strickland Universal Ball Joint Vise

Illustrated herewith is the Strickland Universal Ball Joint Vise which has been brought out by Engineering Service Inc., Box 44, Huntington Park P. O., Los Angeles, Cal. The simple fundamental principle of the ball joint is u to provide great versatility. Accordi to the manufacturer, any horizontal gular position, any vertical angle co bined with any horizontal angular po tion, and any compound vertical an combined with any horizontal angu position is available with the vise. S tings are instantly and accurately tained by matching the ball joint ver cal degree graduation with the horiz



Strickland Universal Ball Joint Vise



BOYAR-SCHULTZ Profile Grinder

Machines that speed the making of TOOLS, particularly necessary in the National Defe Program.

Boyar-Schultz Profile Grinders fit right into t spot where precision profile grinding is require Grinding and fitting irregular contours and co difficult shapes; grinding dies and punches; grin ing to scribed lines; making templates and cam work of this type is done with Boyar-Schultz Profi Grinders quickly and expertly, and in many i stances by workmen who would be unable to such work using older methods.

Bench Model, No. 1, for work requiring wheels large as ¾" in diameter.

Floor Model, No. 2, for larger and heavier wo using wheels up to 2½" in diameter.

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For PERFECT RIVETING —fast and smooth

Hanna Squeeze RIVETERS

AS production speeds up all along the line it's mighty important that those rivets you drive — each and all of them — are set as positively as they should be. Speed is the thing! — but with efficiency. There's no time for wasteful guessing in riveting today. No need either. For with a Hanna each piston stroke drives a rivet home — a tight rivet that you know completely fills the hole, because a Hanna Riveter delivers the same predetermined tonnage on *every* squeeze.

The Hanna Riveter is unlike any other . . . it doesn't set a rivet with a variable power stroke, *but exerts a controlled and positive squeeze.*

What is your riveting problem? If it's light jobs or heavy — requires portable or stationary equipment — there are over 700 Hanna styles and sizes to squeeze your rivets, hot or cold. We'll gladly talk it over without any obligation . . . we've forty years of riveting experience.

HANNA ENGINEERING WORKS

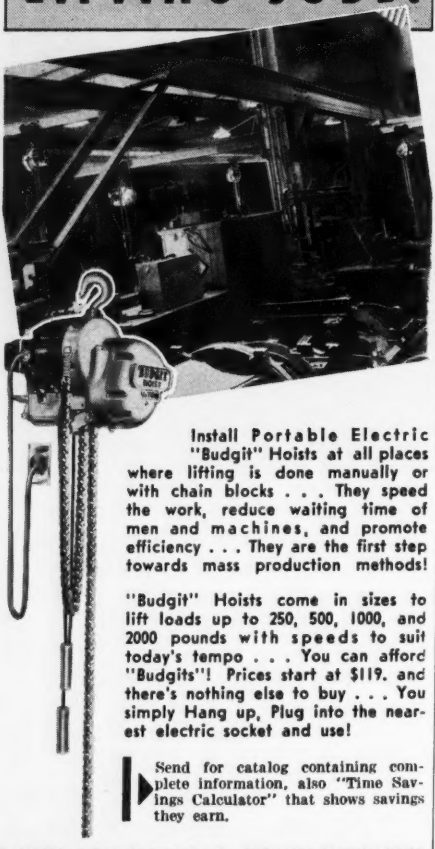
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Air and Hydraulic RIVETERS

Air and Hydraulic CYLINDERS

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MECHANIZE YOUR LIFTING JOBS!



Install Portable Electric "Budgit" Hoists at all places where lifting is done manually or with chain blocks . . . They speed the work, reduce waiting time of men and machines, and promote efficiency . . . They are the first step towards mass production methods!

"Budgit" Hoists come in sizes to lift loads up to 250, 500, 1000, and 2000 pounds with speeds to suit today's tempo . . . You can afford "Budgits"! Prices start at $119. and there's nothing else to buy . . . You simply Hang up, Plug into the nearest electric socket and use!

Send for catalog containing complete information, also "Time Savings Calculator" that shows savings they earn.

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Makers of all types and sizes of Electric and Hand Operated Cranes and Electric Hoists . . . **Send all your crane and hoist inquiries to "Shaw-Box"!**

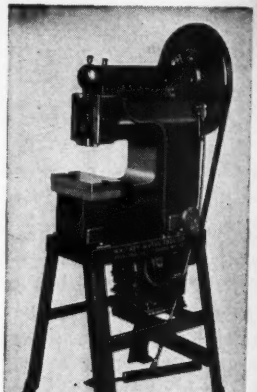
Portable Electric **"BUDGIT" HOISTS**

tal degree graduation required. Aft settings have been made, the vise rigidly locked with a single movem of a clamp wrench.

The Strickland Universal Ball Joi is especially recommended for ch breakers, curlers, rake angles, and on, on both carbide and other cutti tools. The vise is 5 in. high, 5¼ i wide, has a 30-deg. arc through a hor zontal plane, and is furnished with a adjustable leather dust apron for co ering ball and socket.

Whitney-Jensen Heavy Duty Power Press No. 129

The illustration shows the Whitne Jensen Heavy Duty Punch No. 1 which has been introduced by the Whi ney Metal Tool Company, 110 Forb



Whitney-Jensen Heavy Duty Power Press No. 129

St., Rockford, Ill. The design of th punch is comparatively simple, yet th machine is modern, strong, and durabl in every respect. All parts are stand ardized. The press is especially desig ed for plants doing sheet metal wor on aircraft, heating, air conditioning stove, and sign manufacturing.

The frame is of steel plate welde box-type construction with a safety fa tor of 100 per cent of maximum c pacity. The flywheel is located at t

EVERY FEATURE *You Need in a* HEAVY DUTY DRILL!



VAN DORN'S ¼" HEAVY DUTY DRILL with Portomatic Keyless Chuck is especially suited to constant production work. Check these features:

- **FAST BIT CHANGING** Portomatic keyless chuck with patented gear locking pin saves time in changing bits. (Can be supplied with Jacobs geared chuck).
- **POWER** Famous Van Dorn Power from heavy-duty Universal motor to keep boring, even in toughest steel.
- **PERFECT CONTROL** Instant release safety trigger switch and trigger guard prevents pinching.
- **PERFECT BALANCE** Condensed gear train reduces nose-heaviness.
- **LONG, TROUBLE-FREE LIFE** is assured by spline mounted spindle gear and spindle bearing with inner and outer races locked in place. Full ball-bearing equipped.

"Van Dorn"

(DIV. OF BLACK & DECKER MFG. CO.)

THE "RED HEADED" PORTABLE ELECTRIC TOOLS

LS • DRILL STANDS • HAMMERS • SAWS • SCREW DRIVERS • TAPPERS • NUT RUNNERS

SANDERS • PORTABLE GRINDERS • SHEARS • BENCH GRINDERS • DIE GRINDERS

rear of the machine so as not to interfere with work. Automatic stock feeding devices can be furnished. Standard equipment includes a polyphase motor, V-belt drive, three station clutch dog pins in the flywheel, adjustable brake shoe on the main shaft, and safety device to prevent ram from descending when changing punches or dies.

The machine is of 5-ton capacity. The main shaft, which is of SAE steel, is 1¾ in. Length of stroke, 1¼ in. Stroke adjustment, 1¾ in. Depth of throat, 12 in. Die space with stroke down, adjustment up, 4 in. Size of bolster plate, 1¼ x 6 x 12 in. Diameter of flywheel, 20 in. Weight, 150 lb. Speed of flywheel, 135 r.p.m. Height from floor to center of shaft, 52 in. Weight, 710 pounds.

Steel Carrying Case for Dumore No. 8 and No. 10 Hand Grinders

Designed to protect hand grinders from shoproom dirt and to prevent hand grinding equipment from being misplaced, The Dumore Company, Racine, Wis., has developed a sturdy steel carrying case for use with either Dumore No. 8 or No. 10 Hand Grinders. The case is 11 x 4¼ x 3¼ in. in size and has a smart green wrinkle finish. It also has a compartment for storing extra mounted grinding wheels, abrasive bands, and arbors. The case is especially valuable for storing hand grinders in toolrooms and for keeping grinder and equipment intact when moving from one job to another.



Steel Carrying Case for Dumore No. 8 and No. 10 Hand Grinders

CHATTERLESS COUNTERSINKS



Severance countersinks are designed to take heavy cuts and at the same time produce an amazingly smooth seat. The Cutting teeth are so arranged as to give a shearing cut and make chatter almost impossible. Special countersinks made in various combinations of angles, diameters, lengths, ball nose, double angle, and shank types and sizes.

Submit your problems with full particulars to our engineers or write for Bulletin No. 12-B.

We also offer a complete line of Midget Milling Cutters, ground by hand from the solid after hardening. They do a faster, cleaner job than rotary files, last longer and can be reground repeatedly. Unlimited forms, shapes, helix angles, etc., are readily obtainable. Write for full details.

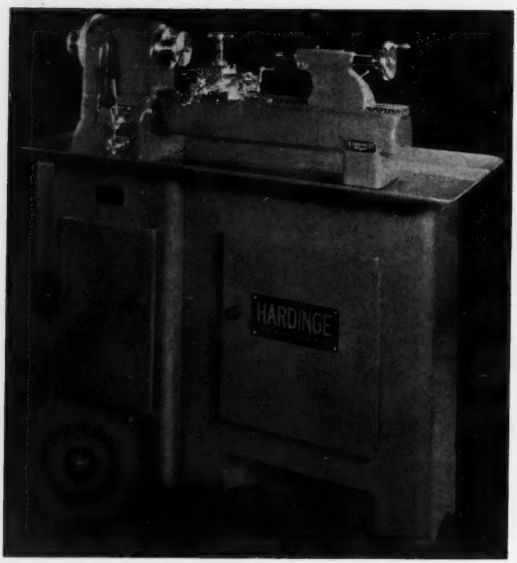
Severance Tool Manufacturing Co.
1516 East Genesee Ave. » Saginaw, Mich.



Contact your nearest Midwest office—Cincinnati, Cleveland, Chicago, Indianapolis, New York, Philadelphia, Pittsburg, Salt Lake City, Springfield, Mass., St. Louis, Syracuse, Tulsa, Toledo.

Hardinge High Speed Precision Lathe

Hardinge Brothers, Inc., 1316 College Ave., Elmira, N. Y., has introduced the high speed precision lathe shown in the illustrations herewith. The lathe features an enclosed head with preloaded ball bearing spindle construction, an electrical driving unit with multi-speed motor designed to eliminate all gears, clutches, and loose pulleys, a convenient lever speed control at the headstock, and a welded, all-steel pedestal.



Hardinge High Speed Precision Lathe

The bed of the machine is amply p portioned and rests on three spheres perfect three-point suspension to gu against any distortion which may res from an uneven floor. The headstock said to be the ultimate in design preloaded ball bearing spindle constru tion. The bearings are fu enclosed in an inner chamb and effective seals exclude f eign matter from entering the front or rear of the sp dle. The rear of the spin carries a double V-pulley two endless belts from driving unit. The endless be may be applied or remov without removing the hea stock spindle or bearings. handwheel is provided turning the spindle by h when setting up, making te or when finishing a thread hand. The collet draw spin is notched for a spann wrench supplied with the ma chine and has a ball bear section to absorb thrust.

The compound slide rest fe tures large beveled dials f ease of reading. The adju able dials are plainly mark and are graduated in thou andths of an inch. The scre and nuts for the compou slide rest are manufactur from materials specially s lected for long wear, accor ing to the manufacturer, t tailstock spindle, regardless of positi never loses any of its full bearing s has a precision ball bearing to abso thrust. The spindle is graduated eighths of an inch and the handwh to thousandths of an inch.

The two levers at the headstock e control low-stop-high and forward-bri

Filing Sawing Stoning

GREATER ACCURACY LONGER LIFE

Shop men who use the ILLINOIS Die Filing Machine know that it turns out work of higher accuracy years longer than ordinary bench filers. Quality construction is evidenced by such features as hardened and ground shafts operating in bronze bushings plus a pressure oiling system. Write for descriptive literature today.

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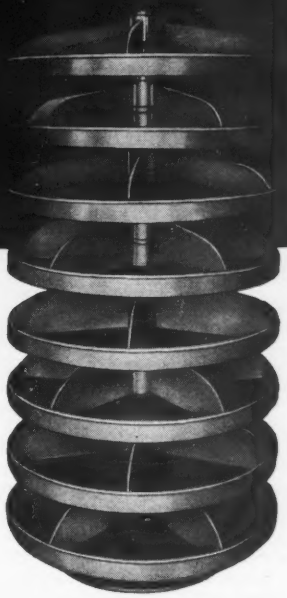


ILLINOIS DIE FILING MACHINE

Now - Speed up your shop production with this new **REVOLVING** *bin!*



FOR SMALL TOOLS & PARTS



Saves wasted Time and Space

No more wasted steps - no more digging around in cluttered-up boxes or dark shelves - *a flip of your hand spins the parts you want into plain sight, pronto!* Each wheel rotates separately, either direction, on ball bearings.

This bin helps you make more money: (1) by reducing unproductive time costs, and (2) by increasing workers' production. You also save 50% floor space, for more profitable uses. *Look into this idea* - write or phone for literature and name of nearest dealer.

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139 WEST 23rd ST. • TELEPHONE CHELSEA 3-3000

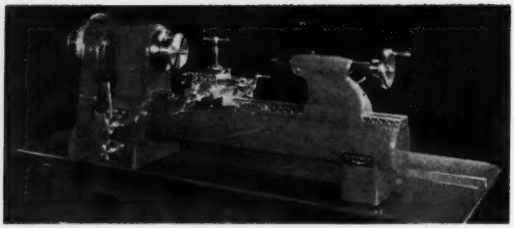
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UF UNIVERSAL FIXTURES

"UNIVERSAL" REVOLVING BIN



Close-Up View of Hardinge High Speed Precision Lathe

stop-reverse spindle speeds through the operation of electrical motor controls which are conveniently located to the left of the pedestal and are enclosed by a cover. A metal chart at the front of the machine shows the speeds that can be obtained from the driving unit; eight forward and eight reverse speeds ranging from 230 to 3,900 r.p.m. The chip pan of the lathe is designed so that chips can be readily removed from it.

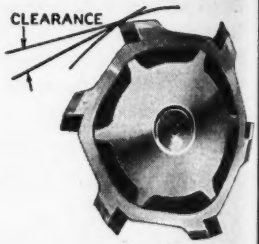
The welded steel pedestal completely encloses the motor and driving unit, thereby affording greatest safety for the operator and the machine. The pedestal enclosure also protects the driving unit from foreign matter. The pedestal driving unit, according to the manufacturer, assures every means of protection for the machine spindle from vibration, since the motor and drive are located at the bottom of the pedestal, with the motor completely insulated from the pedestal by rubber cushions. The motor belt is easily changed from one step of the motor pulley to another through the medium of a large door in the front of the pedestal. The ample cabinet storage space with two shelves for tools and attachments is reached through a door on the right-hand side of the pedestal. A collet board mounted on the door provides storage for collets and lathe centers. In addition, the pedestal is arranged for adequate ventilation.

The Hardinge High Speed Precision Lathe is equipped with a brake for rapidly stopping the spindle, thereby increasing production in toolrooms and production departments. The brake can be readily adjusted from the front of the machine without removing any part of the machine or driving unit. The high speed precision lathe is offered in

Stop REGRINDING YOUR REAMERS AFTER EACH RE-SIZING!

The Staples type Carboloy-tipped reamer eliminates regrinding operations after each resizing because clearance is automatically provided through a patented plug that tilts the blades, presenting in effect, a new cutting edge each time the reamer is expanded. Because of this, Staples reamers may often be expanded several times without a regrind and without affecting the finish of the hole. This enables you to hold accurate sizes with a minimum servicing of the reamer. Staples reamers can be easily adjusted to 1/10,000 of an inch. Sizes range from 1/4" dia. to 1 1/2" dia. Write for leaflet. Sold through Carboloy Company or direct from—

STAPLES TOOL & ENGINEERING Co.
Cincinnati, Ohio



Carboloy Tips PATENTED.

Re-sizing automatically provides clearance without regrinding!

STAPLES REAMERS CORE DRILLS

"Why I Recommend this High-Speed Tapping Head"



A superintendent of a prominent western manufacturing company writes: "A short time ago we purchased several type "E" high speed precision tapping attachments equipped with the new "Procunier" TRU-GRIP Tap Holders. The positive drive effected from the chuck body through the collet to the square of the tap, is one of the finest arrangements that could possibly be put on a tapping attachment. The extreme smallness of the new TRU-GRIP Tap Holder which affords clear vision and close tapping to any wall on the part is very beneficial to us.

"The lightness in weight which reduces fly wheel effect to a minimum, and the accuracy with which the tap is driven, are features which prevent tap breakage and insure precision tapping. The simplicity of the tap holder and the visible drive feature are a great help to our operators. These are some of the reasons why I recommend the Procunier High-Speed Tapping Head."

SEND FOR BULLETIN

giving full details, description and prices on complete line of Procunier Precision Tapping Heads to meet all needs, the new TRU-GRIP Tap Holder—and also the full line of Procunier Universal Tapping Machines, hand, foot or air-operated.

Procunier Safety Chuck Co.
12 S. Clinton St., Chicago, Illinois

Send me Bulletins on: ☐ High Speed Tapping Heads ☐ Tru-Grip Tap Holders ☐ Universal Tapping Machines

Name.....

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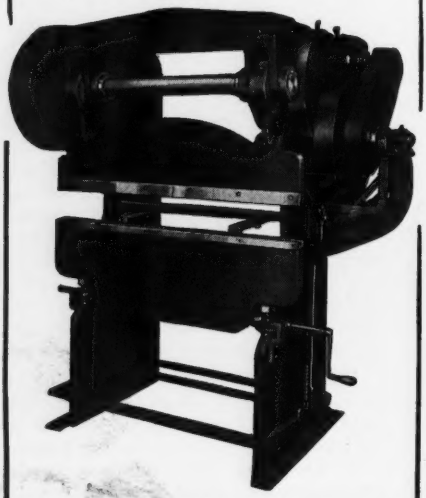
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PROCUNIER

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CHICAGO STEEL PRESS

No. 253



Does 40% to 60% of the forming work turned out by the average shop.

Here's a profitable, economical brake ideally adapted for rapidly forming metal sections such as in stoves, refrigerators, soda fountains, steel cabinets, metal furniture, steel boxes, and a great variety of sheet metal specialties. Its variable speed drive operates from 17 to 50 strokes per minute. The No. 253 CHICAGO STEEL PRESS is accurate, compact, and ruggedly constructed of highest quality materials.

Sizes 4, 5 and 6 ft. capacities up to 10 gauge.

Write for Circular No. 253

DREIS & KRUMP MFG. Company

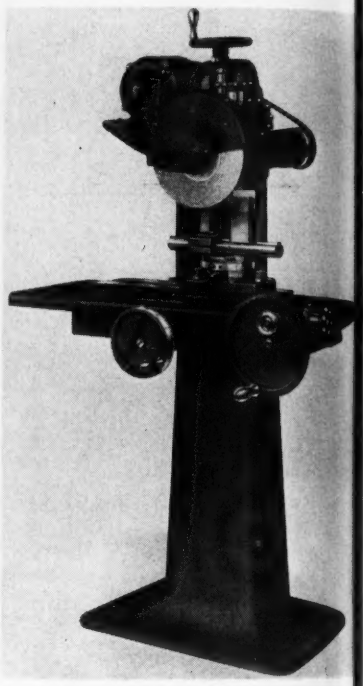
7418 LOOMIS BLVD.

CHICAGO ILLINOIS

five sizes up to 1-in. collet capaci and 9-in. swing.

Geometric No. 20 Chaser Grinder

To meet the demand for a single pu pose chaser grinding machine, The Ge metric Tool Co., New Haven, Conn has brought out the No. 20 chas



Geometric No. 20 Chaser Grinder

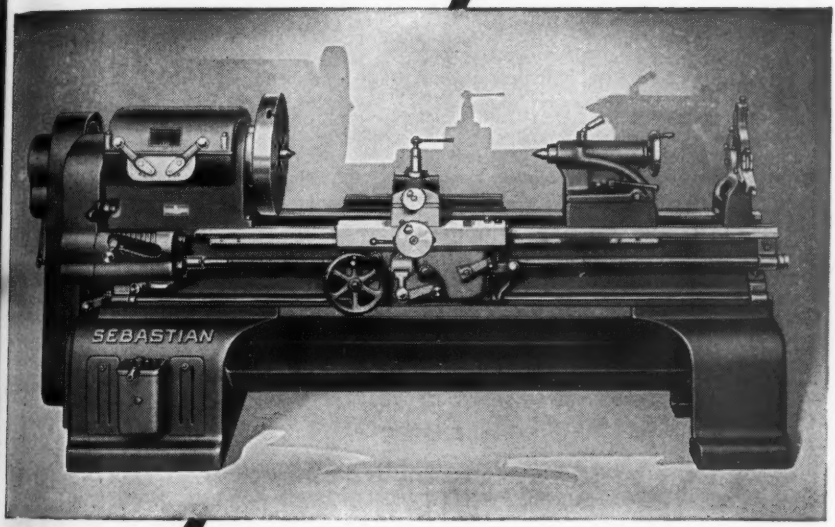
grinder shown herewith which is de signed specifically for the accurate m sharpening of chasers both on the chan fer and on the cutting face. According to the manufacturer, the grinder is sim ple, compact, and very easy to operat

The table is mounted directly on plane ground surface and may be ma ually fed both longitudinally and tran versely. The spindle housing is pivo ally mounted on saddle equipped wi three ground ways. The saddle can b adjusted vertically by means of an el

See

SEBASTIAN LATHES

First!



Here are the principal features of all SEBASTIAN Type H Lathes . . .

1. Timken Bearings on all shafts in headstock (including spindle) assuring accuracy and from 15% to 20% more power.

2. Oversized heat treated, hardened and shaved steel gears in headstock assuring quiet operation.

3. Knob control handle for apron length feed friction (no springs) gives a positive in and out—very useful when approaching a shoulder.

4. Feeds (12"—.00175 to .111), (14" to 20"—.002 to .252). Threads—3 to 384. Feed and thread changes—72. Accuracy .0005" at every point of alignment.

WRITE FOR COMPLETE DETAILS

THE SEBASTIAN LATHE CO.

CINCINNATI OHIO, U. S. A.

vating handwheel. After adjustment has been made, the saddle can be firmly locked in position against the ways by a convenient binding knob. Final vertical adjustment of the grinding wheel is made by means of a small micrometer handwheel. According to the manufacturer, the weight of the driving motor in combination with the pivotal spindle mount prevents any backlash from developing in the micrometer spindle adjustment.

For rechamfering conventional milled or tapped die head chasers or collapsing tap chasers, a Style E Geometric Universal Grinding Fixture such as shown mounted on the machine in the illustration is recommended. A Style A Geometric Chamfer Grinding Fixture can also be used with the No. 20 chaser grinder but is recommended only for use with milled chasers. While conventional chasers of the milled or tapped type or collapsing tap chasers can be resharpened one at a time on the cutting face by means of the Style E grinding fixture, from the standpoint of economy it is recommended that a complete set be resharpened at one setup. For resharpening the cutting face of tangent or circular chasers, a Style F grinding fixture is specified.

Specifications of the Geometric No. 2 Chaser Grinder are as follows: table longitudinal travel, 8 in.; working surface, 4 x 19 in.; tee slot, $\frac{5}{8}$ in.; combination rapid and micrometer feed; each graduation on micrometer dial 0.001 in.; transverse, $3\frac{3}{4}$ in.; each cross-feed handwheel graduation, 0.001 in.; wheel head, distance from center of spindle to top of table, maximum, $13\frac{1}{2}$ in., minimum, $2\frac{1}{2}$ in.; combination rapid and micrometer feed; each graduation on micrometer dial, 0.0005 in.; for chamfering, 9 x $\frac{3}{4}$ x $1\frac{1}{4}$ in. dish wheel; for face grind with magnetic chuck, 9 x $\frac{1}{2}$ x $1\frac{1}{4}$ in.; motor, 1/3 h.p. single or polyphase—V-belt drive; floor space, 44 x 32 in.; net weight complete with motor, 560 pounds.

Tolhurst Centriforce Washer

A centrifugal machine which washes, rinses, and dries small metal parts, to be known as the Tolhurst Centriforce Washer, has been placed on the market by Tolhurst Centrifugal Division, American Machine and Metals, Inc., East Moline, Ill. The unit is designed for





THERE'S LONGER LIFE IN *Bath Taps*

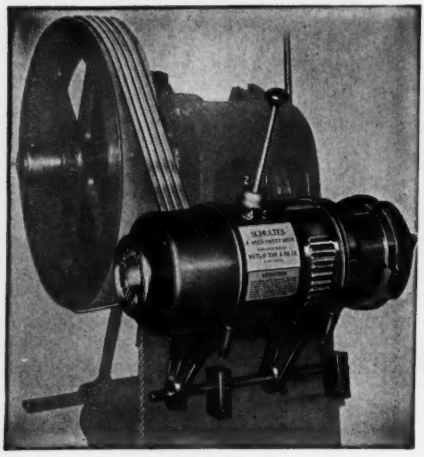
● You can resharpen a BATH TAP again and again without loss of efficiency because its metal structure is correct and uniform.

This uniformity from core to cutting edge is brought about by the Bath method of grinding from the solid AFTER hardening.

Next time order BATH "ground from the solid" TAPS—they last longer and therefore cost less.

JOHN BATH & CO. ● WORCESTER, ● MASS.

NEW
ALL-HELICAL GEARED 4 SPEED SCHULTES UNIT
Instant Reversibility



Features:

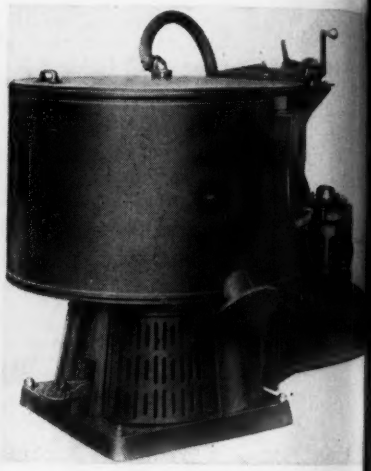
For punch presses, lathes, shapers, milling machines, drill presses, etc.
One lever syncromesh shift controls 4 speeds.
Instant reversibility with all 4 speeds.
Adapted to V-belt, flat-belt, chain or direct drive.
Hand wheel permits rotation of machine spindle for set-up work with complete safety.
Cradle adjustment permits the unit to be revolved to any desired position . . . placing gear shift lever where most convenient.

Write for illustrated folder

WESTLOF TOOL & DIE CO.
430 BELLEVUE AVE. DETROIT, MICH.

use in finishing departments and pla
ing plants.

As a detergent washer, the Cent
force washes screw machine parts wi
hot detergent solution to remove o
grease, dirt, or fine chips. As a rinse
the work is spun in the centrifug
while a spray of hot water swi
through the parts. As a drier, the ma



Tolhurst Centriforce Washer

chine is revolved at high speeds whil
blasts of hot air are forced through
and around the parts.

According to the manufacturer, up t
25 batches of work per hour can be
handled in the washer.

Lindberg Cyclone Production Box Type Tempering Furnace

Shown herewith is the Lindberg Cy
clone Production Box Type Tempering
Furnace which has been announced by
the Lindberg Engineering Co., 221 N.
Laflin St., Chicago, Ill. The furnace
utilizes the Cyclone forced convection
heating principle by which large vol-
umes of accurately heated air are driven
through the work under pressure and
at velocities around two miles per min-
ute. As a result, heating is rapid, and
every part of the charge is said to be
heated to exactly the same temperature.

The Lindberg Production Box Type
Cyclone is built to accommodate heavy



YOU CHANGE THE SIZE BUT NOT THE DIES, WITH A "RAPIDUCTION"

Here's another one of OSTER'S "New Ideas for New Days"— new production speeds for today's demands, made possible because *one* "RAPIDUCTION" Die-Head and only *one* set of chasers handle all pipe sizes of the same pitch, *without change.*

High labor cost, today, requires maximum production from every piece of equipment in your shop, to save time. The "RAPIDUCTION" will do just that on your pipe threading jobs, with both its "no change" die-head and its wide range of spindle speeds.

"RAPIDUCTIONS" are made in four sizes No. 4 - 1" to 4"; No. 6-A - 1½" to 6"; No. 8 - 2½" to 8"; No. 12 - 3½" to 12"

OSTER THREADING EQUIPMENT WILLIAMS

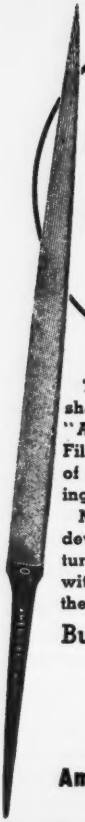
Let us quote you on the right size "time saver" for your requirements — there's no obligation of course.

THE OSTER MANUFACTURING CO.

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that every file user should know



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This is the number of different shapes, cuts, and sizes in which "American Swiss" Swiss - Pattern Files are available—your assurance of exactly the right file for every filing job, whether intricate or simple.

Made in the largest American plant devoted exclusively to the manufacture of Swiss Pattern Files, and made with only one standard of quality—the best.

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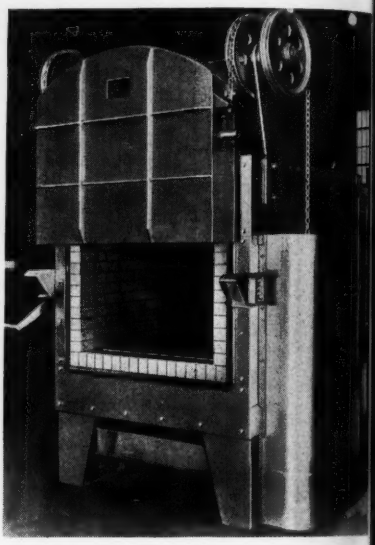
ONLY THE BEST ART LOUIS NOUGH TRADE MARK

American Swiss File & Tool Co.
ELIZABETH, N. J.

AMERICAN
SWISS PATTERN FILES

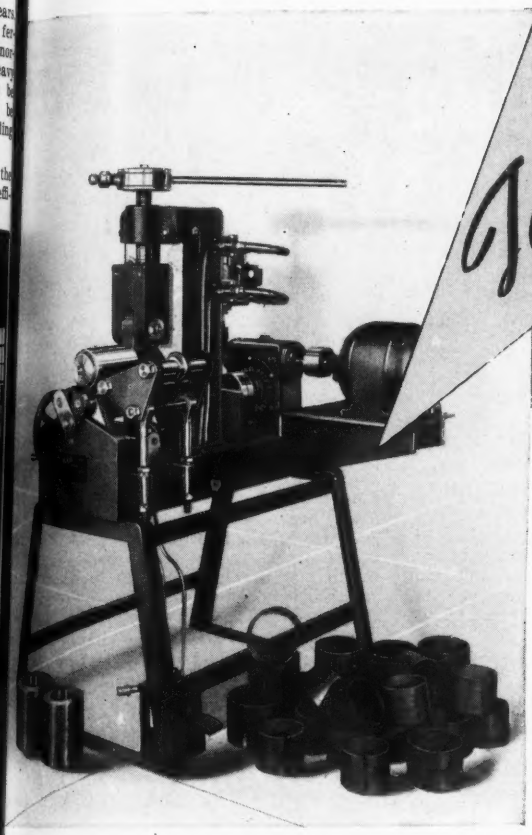
production loads such as large gear forgings, and aluminum, as well as ferrous aircraft parts. The furnace is normally supplied with a standard heavy cast grid on which the work can be loaded; however, sliding grids can be supplied as well as special handling means when necessary.

According to the manufacturer, the furnace is designed to give high efficiency and long life under continuous hard service. The heavy steel plate shell of the unit is reinforced with structural angles which extend to the floor, forming broad base supports. The furnace stands at convenient height for access to the work chamber. Counterweighted vertical lift doors are standard equipment and are gasketed to prevent heat loss. Air-operated doors are also available. Lining of the furnace is of light-weight refractory insulation which is in the form of bricks and slabs.



Lindberg Cyclone Production Box Type Tempering Furnace

The fan of the Lindberg Production Box Type Cyclone is of the pressure blower type, built of non-oxidizing metal and supported on short-centered air-cooled ball bearings. The drive motor is mounted on a tilting base and is connected with the fan pulley by a



Talk about SPEED!

Here's Lightning Speed for Rolling Metal Rings and Cylinders . . .

NOT just an ordinary machine, this Buffalo Wrapping Roll! Besides turning out the regular run-of-the-shop rings and cylinders, it lends itself efficiently to fabricating many units that were formerly cast. And all but the heaviest work is finished in a single trip through the rolls—while complicated work can be removed without disturbing the set-up or adjustment . . . Sizes available to handle thicknesses from 1/16" to 1¾", for working gear rims, motor frame shells, pipe couplings, steel pulley rims, roller bearing races—and scores of other jobs. Start saving on operating costs *today*—write for Bulletin 3150.

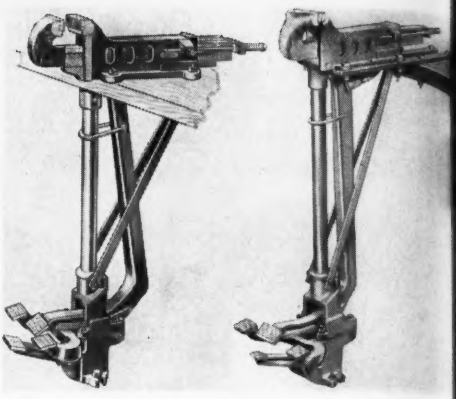
BUFFALO FORGE COMPANY
388 Broadway **Buffalo, N. Y.**

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo" **WRAPPING ROLLS**

texrope drive. The heating elements are made of high grade nickel chromium wire formed into helical coils except where they pass over the refractory spools as a straight wire. The elements are supported by an insulated plug which rests on the top of the furnace and can be easily and quickly removed from the furnace without cooling the chamber or disturbing the charge. An air switch operated by the fan permits the elements to heat only when the fan is running at normal speed.

Standard temperature ranges of the production box type Cyclone are 200 to 850 deg. F. and 200 to 1,250 deg. F.



Automatic Vise and Clamping Tool

Automatic Vise and Clamping Tool

Designed to eliminate lost motion during adjustment and also to give the operator free use of both hands, the Automatic Vise and Clamping Tool shown in the illustration has been placed on the market by The Automatic Vise Sales Co., 2845 Sunset Pl., Los Angeles, Cal. The movable jaw of the unit slides freely and can be easily pushed with the hand or body against the work to be clamped. Movement of the jaw as well as clamping and re-



Full floating; simply adjustable; easy and quick set-up; die can be run on to work before tightening flange; accurate concentric alignment; large openings for chip elimination and proper lubrication; dies securely held; perfect threads; no taper threads; spot inspection only; few rejections; uniform wear, as cutting is made with every lead of die; dies last longer; increased production at lower cost. These features make this tool the first choice of manufacturers who are awake to the advisability and economy of modernizing their screw machine equipment. By completely equipping your machines with ALCO Tools, you can cure your bushing headaches, too, for *no bushings are required with* ALCO *Drill Chucks and Tap Holders*. Write today for detailed information.

THE ALCO TOOL CO.
835 Housatonick Ave., Bridgeport, Conn., U.S.A.

ALCO EFFICIENT TOOLS

MORE LIGHT—WITHOUT GLARE OR SHADOWS—75% COOLER!

That's what you get with those complete, sensational new fixtures of Fluorescent at its finest—HYGRADE MIRALUMES!

Factories and plants report *increased efficiency* with these "packages" of DAYLIGHT!

IT spells tremendous benefits in *any* industry—this amazing new Hygrade Fluorescent Light!

For MIRALUMES *modernize* lighting! Inspections are *swifter*, color-matching is *more accurate*—men *see* better, *work* better, *feel* better!

But *only* MIRALUMES provide *this* Fluorescent! For MIRALUMES are the *only* Fluorescent Units made *complete*—lamps, fixtures and starters—under one roof!



INDUSTRIAL MIRALUME F-100: 100 watts; 2 40-watt tubes; approximate length 54". No nuts or bolts in reflector surface.

Designed, engineered, built and *guaranteed* by HYGRADE!

SHOWN BELOW is one of many MIRALUMES. Eligible for FHA financing. Supplied wired and ready to install, without costly rewiring. Corrected for power factor and stroboscopic effect (flicker). Starters easily accessible.

WRITE TODAY for free catalogue, with complete facts on MIRALUMES: Address: Department MM-10, Hygrade Sylvania Corp., Ipswich, Mass.—or see your Electrical Contractor.

IMPORTANT! Hygrade MIRALUMES are quality manufactured to meet the approval of Underwriters Laboratory; Inc., and are protected by exclusive HYGRADE patents.

LOW COST Hygrade MORE LIGHT FULL LIFE

Fluorescent at its Finest

Hygrade Miralumes

HYGRADE SYLVANIA CORP., EST. 1901. ALSO MAKERS OF THE WORLD-FAMOUS SYLVANIA RADIO TUBES

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leasing is an instantaneous operation, both the clamping and releasing operations being performed through the use of foot pedals. The main clamping pedal provides sufficient pressure for general work, the pressure being regulated light or heavy. If additional pressure is desired, however, a small auxiliary pedal located directly below the main pedal furnishes sufficient pressure to hold practically any type of work. The two side pedals of the clamping tool are for releasing purposes, and all pedals are said to operate with little or no effort.

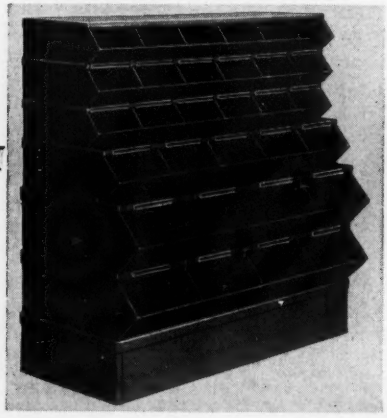
By simply adjusting a small set screw on the right side of the body, the Automatic Vise and Clamping Tool is set for repetitive work and operates automatically. The principal parts of the tool are made of steel and all working parts are case hardened for long life. The vise occupies very little space and can be mounted directly on a bench or away from a bench by using ⅜ x 1¼ x 18-in. strips of steel, one on each side, as anchorage to the bench. The latter installation is said to give greater freedom to work on either side of the tool without bench interference.

The Automatic Vise and Clamping Tool can be supplied with a port stand which enables it to be move all parts of the plant and to be use outside work. The stand is collap and, the manufacturer states, ca knocked down and set up by one in approximately five minutes. vise and stand are said to occupy little space in a motor truck.

Grob Improved Type FA-1 Filing Machine

A heavy duty continuous motion ing machine of improved streamline sign designated as the Type FA-1 announced by Grob Brothers, Graf Wis. The machine has a standard th of 18 in., but can also be made wit 30-in., 36-in. or larger throat.

The improved Type FA-18 mach consists of a one-piece heavy ga welded steel frame. The ½ h.p. m and silent V-belt drive are built into base. Three speeds of 80, 120, and f.p.m. to the files are provided. tiltable table of box and heavily rib construction is made of semi-steel measures 20 x 20 inches.



AUXILIARY STOCKROOMS

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STACKBIN sections will give you a Stockroom wherever you want it—quickly and easily as building a sectional bookcase. These patented sectional storage bins nest together without the use of tools—cost you nothing to build, nothing to move. Find out today how STACKBINS can lower YOUR handling costs.

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53 Troy St., Providence, R. I.

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"STACKED AND STILL ACCESSIBLE"

LUFKIN

CHROME FACE STEEL TAPES



Whether you're working under artificial or natural light you'll find the new Lufkin Chrome Face Steel Tapes easy to read. Jet black markings stand out prominently against the satin chrome surface that won't rust, crack, chip or peel and is easy to clean. If you're interested in the best buy in a steel tape—by all means look at the Lufkin Chrome Face and write for our free catalog No. 12B.

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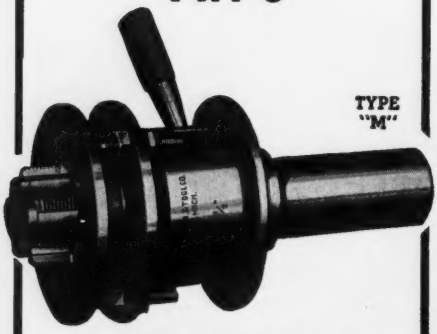
THE LUFKIN RULE CO.
SAGINAW, MICHIGAN

Canadian Factory
WINDSOR, ONT.

TAPES — RULES — PRECISION TOOLS

MURCHEY

COLLAPSIBLE TAPS



TYPE "M"

Are tapping all sizes of Shells and Bombs

Threads guaranteed to meet government specifications.

A universal machine tap that can be used as a stationary tap with handle or as a rotating tap by removing handle. Instant trip at set point.

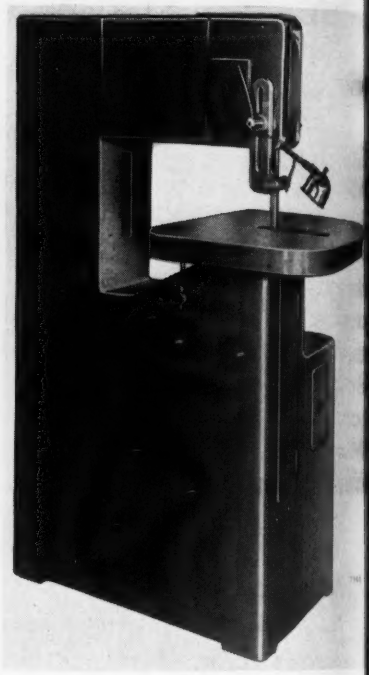
Chasers are rigidly supported and are hooked into tapered seat of the hardened and ground center pin to insure positive opening and closing.

Murchey Mach. & Tool Co.

DETROIT, MICHIGAN

ALL STYLES OF "SELF-OPENING DIE HEADS," AND "BOLT AND PIPE THREADING MACHINES."

The files are attached to a cha which is driven by a lower pulley ha ing spring cushioned pins, providing positive drive to the file-chain. In th manner, very little tension is require to the chain, ensuring long life, and r gardless of how much pressure is a plied by the operator to the work, t files, it is claimed, will not slip nor w



Grob Improved Type FA-18 Filing Machine

excessive pressure harm the machine i any way.

Inasmuch as the file-chain is extreme ly flexible, two pulleys of small diame ter can be used in the upper arm a idlers. The machine, in spite of th large throat, has a low total height an the file-chains are relatively short i length. Underneath the chain pulley channels are mounted which facilitat the inserting of file-chains.

To put a complete file-chain into th machine, the operator stands in fron pushes one end of the chain over th top of the upper front idler pulley an merely keeps on feeding the chain whi

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OLIVER DRILL, TOOL and CUTTER GRINDING EQUIPMENT has been in use by the leaders, in your industry, for years. They have been obtaining longer drill and tool life — Improved products—Lower maintenance costs — So—Why delay—Send for literature on these Modern Tool Conditioning Methods.

* * * *

We welcome your Inquiries.

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Cut Illustrates No. 2 Arc Grinder for FACE MILLS—Provides a perfect radius—Attachments for grinding radii on small cutters. "IDEAL FOR AIRCRAFT WORK."

The OLIVER Line:

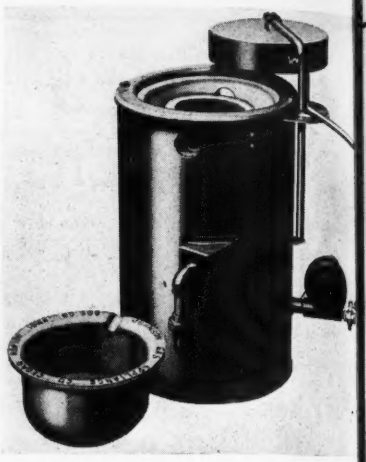
Automatic Twist Drill Grinders, Face Mill Grinders, Tool and Cutter Grinders, Point Thinners, Tap Grinders, Die Making Machines.

OLIVER INSTRUMENT COMPANY
1430 EAST MAUMEE STREET .:. ADRIAN, MICHIGAN

slides in the channels over the other idler pulley and comes out at the bottom in front of the machine. The two ends of the file-chain can then be connected together and tension applied by a single lever movement.

Johnson No. 500 and No. 550 Pot Hardening and Melting Furnaces

Two pot hardening and melting furnaces, designated as the Nos. 500 and 550, for use in case-hardening, tempering, perlitionizing, and melting nonferrous metals are announced by the Johnson Gas Appliance Co., Cedar Rapids, Iowa. Both furnaces are designed for salt, cyanide, and lead hardening, giving instant, high temperatures. They are especially adaptable for use in small shops and are said to eliminate the necessity of heating a large furnace for only a few small parts. The furnaces are also said to be in wide demand by tool makers and small plants for case-hardening, and by pattern and model makers for melting small quantities of aluminum, brass, and nickel-silver.



Johnson Pot Hardening and Melting Furna

The Johnson No. 500 and No. 550 Po Hardening and Melting Furnaces ar strongly constructed, with shields heav ily lined with insulating refractory. Du to the large combustion space below an around the pot, the flame does not im



NEW, LONG LENGTH

STRAIGHT SHANK

HIGH SPEED DRILLS

9" Cutting Flute
12" Long

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Size	Length Overall Inches	Length of Flute Inches	Our Net Price Each
3/16	12	9	$1.50
7/32	12	9	1.60
1/4	12	9	1.75
9/32	12	9	1.85
5/16	12	9	2.00
11/32	12	9	2.25
3/8	12	9	2.50
13/32	12	9	2.75
7/16	12	9	3.00
1/2	12	9	3.25

Orders for 12 or more assorted sizes will take 10% discount from above prices.

Money Refunded If Not Satisfied

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Send for Our New 1940 Catalogue

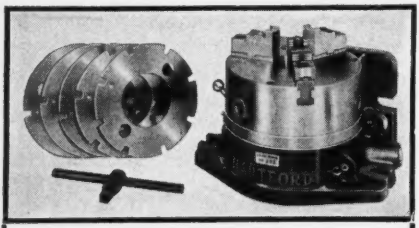
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251 Centre Street **New York, N. Y.**

SAVE TIME, LABOR, and MEN
in Handling Heavy Dies and Machine Parts!
NEW "WELD-BILT"
Hand-Operated Portable
HYDRAULIC DIE LIFTER



This handy, full hydraulic lifting unit will serve a surprising number of needs in YOUR plant! Use it to transport heavy Dies—lift them into position on Production Machinery—raise skid platforms to bench or machine level—double-deck loaded skids—and many other time, labor, and MAN-saving Jobs.
Easy-operating, Weld-Bilt hydraulic mechanism is located *horizontally* beneath the platform. Can be stopped at any point at any speed by finger tip control at handle. Compact, requires little space to operate. Available in five standard sizes, with capacities from 500 to 2500 lbs.
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WEST BEND EQUIPMENT CORP.
West Bend, Wisconsin
• *MATERIALS HANDLING ENGINEERS* •



HARTFORD "Superspacer"

Adaptable for milling, drilling, slotting or planing. For rapid indexing, simply release clamp, withdraw index plunger, revolve turret. Standard equipment — six mask plates, self-centering chuck, sliding handle wrench.

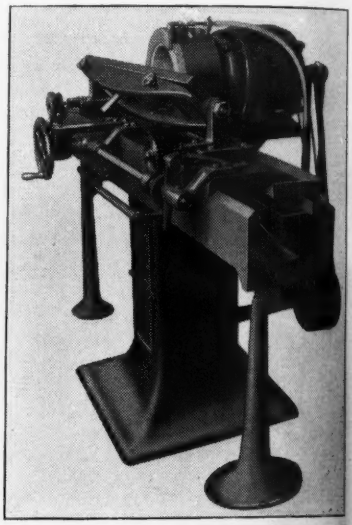
WRITE FOR FOLDER.

HARTFORD
SPECIAL MACHINERY CO.
HARTFORD • CONN.

pinge directly against it. The furnaces are furnished with steel pot, lid, derrick for lifting lid, and Johnson blower. Temperatures are easily regulated and the gas consumption is said to be low. The No. 500 furnace has a steel pot of 6 in. in diameter by 8 in. deep, while the No. 550 furnace, which is of larger capacity, has a steel pot of 8 in. in diameter by 10 in. deep.

Rogers Improved Type "B" Automatic Knife Grinder

An improved Type "B" automatic knife grinder has been added to the line of grinders marketed by Samuel C.

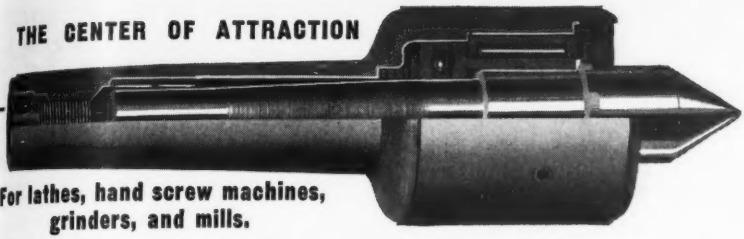


Rogers Improved Type "B" Automatic Knife Grinder

Rogers & Co., Buffalo, N. Y. The grinder is made in five sizes to accommodate knives from 26 to 54 in. long. Features of the grinder include a heavy, reinforced carriage bed, sturdy knife bar and increased weight, all of which are said to combine to provide greater accuracy and longer life.

The improved Type "B" grinder is adapted for grinding knives, edges up or down, and is equipped with a 1½ h.p. motor and 10-in. diameter grinding wheel. It is designed for grinding a

THE CENTER OF ATTRACTION



For lathes, hand screw machines, grinders, and mills.

Economical Live Ball and Roller Bearing Centers are going to play an important part in our defense program.

The features that interest you most:

1. Simplicity, sturdiness, and heavy duty.
2. 50% more radial load carrying capacity than the average live center.
3. Large spindle, small head, short overhang most desirable for rigidity and to be free from chatter.
4. With aid of cap screw you can lock spindle to redress point right in your machine.
5. Special oil seal to retain lubricant and keep out foreign matter.
6. A compression pad to compensate for heating and expansion of metal as a safety factor, with resonable diligence exercised.

A folder giving prices and complete details will be mailed to you upon request.

A ten-day trial. If not perfectly satisfied, your money will be cheerfully refunded.

MOTOR TOOL MFG. CO. 12282 TURNER AVE. DETROIT, MICHIGAN

SHEAR-CUT

HIGH SPEED

END MILLS



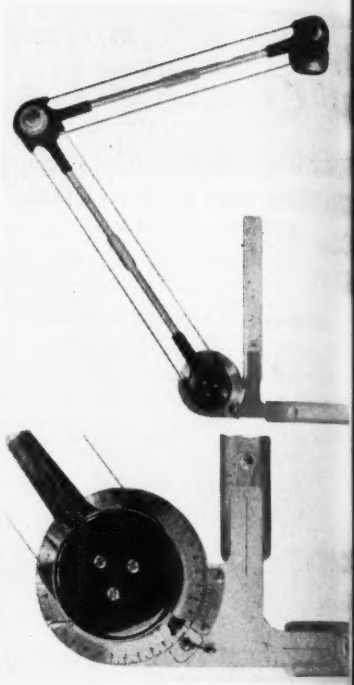
Here's a complete line of
Single and Double End Mills.
They save time and money.
Specify Progressive Shear-Cut End Mills.
Write for catalog and prices.

PROGRESSIVE TOOL & CUTTER CO.
2345 WOLCOTT ST. FERNDALE, MICH.

variety of knives including paper, hog, and woodworking knives as well as light shear blades.

Veeco Drafting Machine

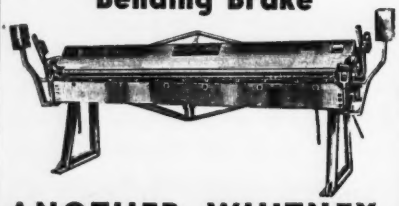
The V. & E. Engineering Co., 758 South Fair Oaks, Pasadena, Calif., is now manufacturing a drafting machine featuring combination manual and automatic indexing, to be known as the "Veeco." The change from manual indexing to automatic indexing is effected by simply pressing a thumb piece located in the handle of the machine, moving it laterally toward the operator, and then releasing it. When the machine is set for automatic indexing, the protractor arm is automatically held at any one of the predetermined angles (multiples of 15 deg.) while the usual stresses are applied in moving the head of the machine over the drawing table.



Veeco Drafting Machine

WHITNEY-JENSEN TOOLS

18 Gauge Combination Bending Brake



ANOTHER WHITNEY-JENSEN IMPROVEMENT

All of our bending brakes are now equipped with hardened jaws, which is practical in the forming of stainless steel.

Write for complete information.

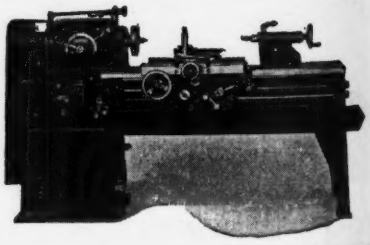
Whitney Metal Tool Co.
110 FORBES ST. ROCKFORD, ILL.

"C & J"

15" and 16" Lathes

12 Speed Geared Head-Motor Drive
Timken mounted spindle
Modern Design ... Liberal Dimensions

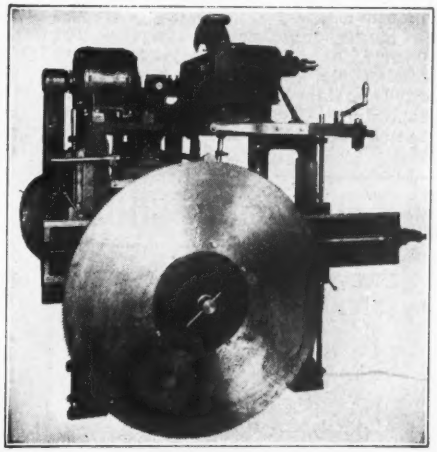
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The Carroll & Jamieson Machine Tool Co.
BATAVIA • OHIO, U. S. A.

THE COVEL HANCHETT No. 146
84" CAPACITY SAW SHARPENER

FOR FULL AUTOMATIC GRINDING OF HOT AND COLD METAL CUTTING SAWS FROM . . . . . 36" TO 84"

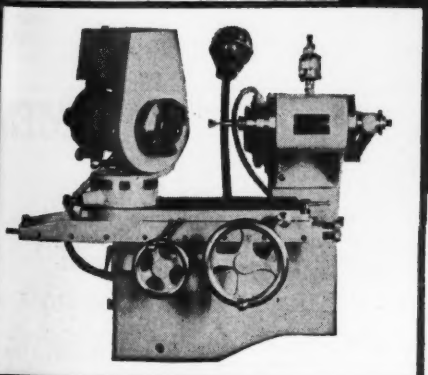


A full line of automatic Sharpeners for all saws from 2 to 120" diameter

SAW and KNIFE FITTING MACHINES AND TOOLS

COVEL HANCHETT CO.
Big Rapids, Mich., Portland, Ore.

BERGRAM
Bench Type INTERNAL GRINDER
IG-1



An accurate grinder suitable for set-ups that require quick changes for straight, tapered and beveled holes or for single-purpose production. Diamond dresser automatically controls selected hole size.

By changing spindles, this model grinds all sizes of holes from 3/16" to 3".

Write for complete details

BERGRAM
Mechanical Engr. Co., Inc.
NEW BRITAIN • CONN.

but is released when greater stresses are applied for the purpose of changing to another angular position.

The Veeco Drafting Machine is equipped with a positive band tightening device that is said to be simple to operate and is designed so as not to work loose. A smooth elbow brake readily adjusted by a single thumbscrew prevents the machine from sliding when placed on an inclined table. The braking action is afforded by large disks of high quality brake lining. The arms of the unit are so articulated with the brackets that the head adjusts itself to irregular in the drawing surface, and the se are said to always lie flat. The hea the machine can be raised high of table to facilitate positioning of drawing paper and is supported b large, centrally-positioned skid bu of high grade plastic that does not the paper. Resilient scale pockets the scales of the Veeco Drafting chine firmly, yet are designed so the scales can be readily released. large protractor provided with the chine has an engine divided circle 4¾ in. in diameter and is easy to re

KAR DUO MAGNETIC CHUCK

TO HOLD AND DEMAGNETIZE WORK ON ONE UNIT WITHOUT A SEPARATE DEMAGNETIZER



GUARANTEED TO GIVE EFFICIENT AND SATISFACTORY SERVICE

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MANUFACTURED BY THE MAKERS OF KAR TIME-SAVING ACCESSORIES

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Est. 1916

THE KAR ENGINEERING CO., INC.

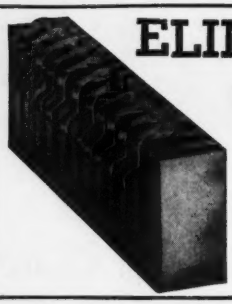
200 Hudson Street New York City

Fell Precision Level

A precision, all-way level for use machine tool building, setting up, maintenance, whether for the establi ment of level working surfaces or the accurate checking of straightn where true level itself is not requir has been brought out by Wm. B. F Company, 698 South St., Rockford, I The ordinary level must be turned two directions. The feature of the Fe Precision Level is that it is made show the level of all ways at once, a is not subject to temperature distorti

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The graduations of the Fell Precisi Level are in 0.0005 in. per foot, an form squares about a circular bubbl thus giving coordinate readings show ing the direction and amount of slop



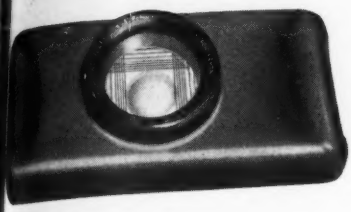
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MAGNETIC HOLDING DEVICES FOR USE ON ANY MAGNETIC CHUCK—GRIND IRREGULAR SHAPES AS EASILY AS FLAT SHAPED PIECES.

PARALLELS - V BLOCKS - PROTRACTOR BLOCK

THE KAR ENGINEERING CO., Inc. 200 Hudson St. New York City

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Fell Precision Level

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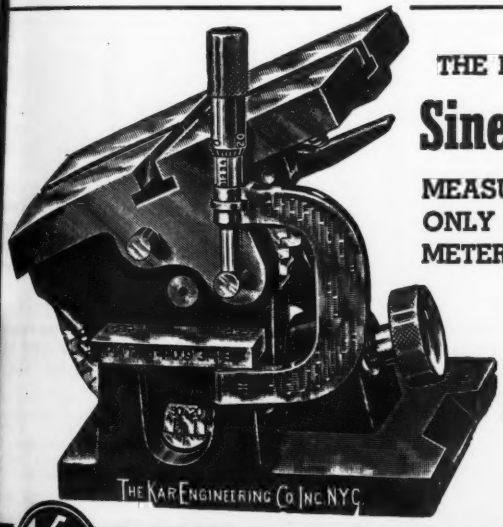
Carboloy Drawing Die Line Extended

Availablility of standard Carboloy round hole dies for drawing sizes of bars and tubing up to 3½-in. diameter, and improvements in construction in the larger sizes—R7 to R16—of standard drawing dies, have been announced by Carboloy Co., Inc., 11143 E. 8 Mile Rd., Detroit, Michigan.

The tendency to use cemented carbide dies for larger sizes of bars and tubing has led to the introduction of the R-18 type as a standard Carboloy die. Carboloy nib dimensions of the die are 5.50 in. in diameter by 2.125 in. in height, with a casing dimensions of 9 by 3¾ in. It is designed for drawing work ranging from 2¾ to 3½-in. diameter.

In addition, "cored" dies previously available only in the smaller series (R1 to R6), are now also available in the series R7 through R10 for drawing fractional sizes of bars and tubing from 3/16 to ¾ in. in size. Rough drilled dies available previously in these sizes, in addition to finished dies, are continued.

Principal improvement in the larger series of dies, from the R10 through the



THE NEW AND IMPROVED

Sine Angle Plate

MEASURES EXACT ANGLES. ONLY A TWO-INCH MICROMETER IS REQUIRED.

Write for Literature

KAR THE KAR ENGINEERING COMPANY, Inc.

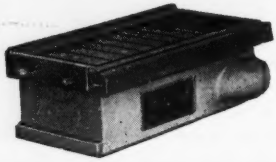
200 HUDSON STREET NEW YORK, N. Y.

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KAR DUO MAGNETIC CHUCK

TO HOLD AND DEMAGNETIZE WORK ON ONE UNIT WITHOUT A SEPARATE DEMAGNETIZER



GUARANTEED TO GIVE EFFICIENT AND SATISFACTORY SERVICE

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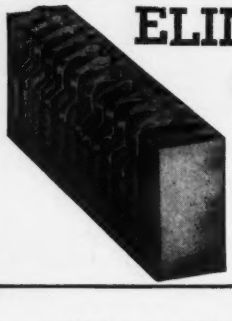
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200 Hudson Street New York City

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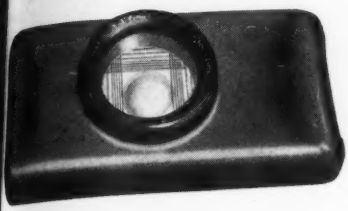
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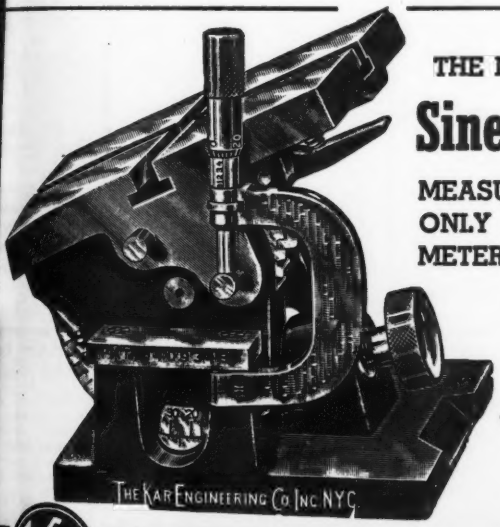
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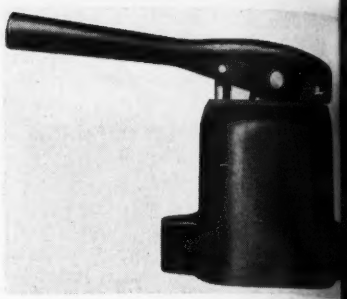
KAR THE KAR ENGINEERING COMPANY, Inc.

200 HUDSON STREET NEW YORK, N. Y.

R16, is a material increase in the size of the nib to provide a longer bearing for easier push start bar-drawing and tube-sinking. Increases in height for the various dies range from 1/16 to 3/8 in.

"Quick-as-Wink" Double Four-Way Air Valve

C. B. Hunt and Son, 1866 E. Pershing St., Salem, Ohio, have developed a double four-way hand-operated air valve suitable for the control of two individual double-acting air cylinders with one valve. This valve is said to have many industrial possibilities on air-operated clamps, fixtures, knives, or in application where it is necessary to have one point of control for two cylinders that lead and lag each other in their respective actions.



"Quick-as-Wink" Double Four-Way Air Valve

The design is such that the working stroke of the first cylinder advances before that of the second cylinder and the return stroke of the second cylinder is completed before the corresponding stroke of the first cylinder. Economy in piping, saving of air, and positive control of two cylinders with one valve are advantages claimed for the "Quick-as-Wink" Double Four-Way Air Valve.

Universal 100 Per Cent Adjustable Die Sets

An aid in reducing the time required to get into production and in answering the problem of providing economical dies for perforating and notching sheet metal is the Universal 100 Per Cent

CENTER POINT WON'T BURN!



because it revolves with the work on a double row preloaded precision bearing. Write for sizes and prices.

THE READY TOOL CO.
BRIDGEPORT • CONN.

DICKERMAN DIE FEED

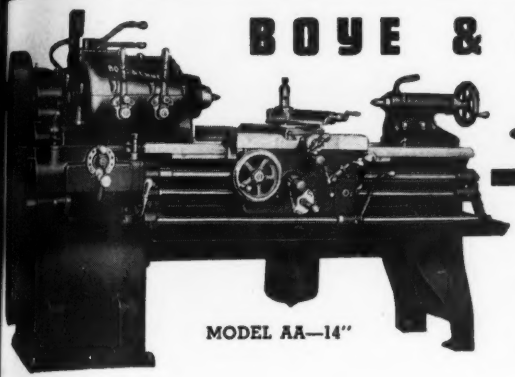
FOR QUICK SET-UPS SHORT OR LONG RUNS



Handles coiled stock any practical thickness. Maximum stock width 4". Adjustable from to maximum feed length of 3" in increments of .001". Accurate.

H. E. DICKERMAN MFG. CO.
321 ALBANY ST. SPRINGFIELD, MASS.

BOYE & EMMES *Lathes*



MODEL AA—14"

Forty years of specialized manufacture are behind this line of heavy duty lathes. Made in a full range of sizes—from 14" to 36"—each of outstanding power, accuracy, range and economy.

Write for Complete Detailed Specifications.

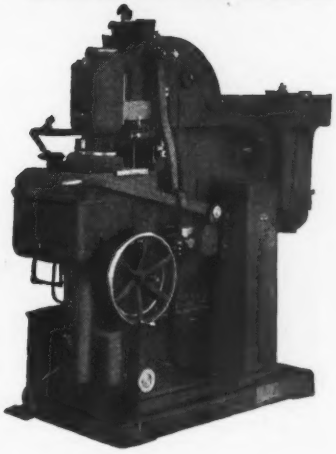
THE BOYE & EMMES MACHINE TOOL CO.

CINCINNATI • OHIO

WALKER

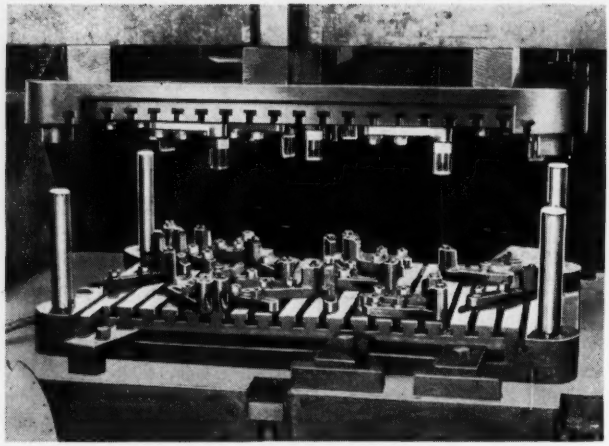
IMPROVED ROTARY SURFACE GRINDER

wering or raising wheel head automatily starts or stops the table and magnees or demagnetizes 12" magnetic chuck. her features include wheel head locking vice and adjustment of upper portion of umn for grinding saws, cutters, etc., hav- hubs up to 6" diameter. Six table eeds are available and a foot brake cilitates quick stopping of table.



. S. WALKER COMPANY, INC.

ORCESTER • MASS.



Universal 100 Per Cent Adjustable Die Set

Adjustable Die Sets introduced by S. B. Whistler & Sons, Inc., 756 Military Rd., Buffalo, N. Y. Made in various sizes, these adjustable die sets permit close grouping of punches and strippers.

The sets may be rearranged as often as the user des... Various sizes ... punches for perfo... ing and notching ... be arranged in di... ent positions to ... the requirements ... the job in hand. ... is claimed tha... difficult arrangem... may be compl... and press operati... started within a ... ter of hours, and ... set-ups can be m... by the operator w... the die set is on ... press.

Being available ... stock sizes from ... 1½ in., most pu... ing arrangements ... be made up wit... any loss of time, ... because of comp... design press operations are said to be ... duced to a minimum through close gr... ing of a large number of dies in a gi... area. In the foreground of the illust... tion are shown several airplane p... perforated on the adjustable die set.

REMOVE BROKEN TAPS



Quickly--

Insert WALTON Tap Extractor and back out broken piece. No annealing—no drilling.

Easily--

Tap Extractor and Tap Wrench are only tools needed.

Safely--

Threads are not damaged. Not necessary to tap oversize after broken tap is removed.

Folder 131 gives complete details.

THE WALTON CO.

96 Allyn Street • Hartford, Conn.

AUTOM

CONTINUOUS HINGE

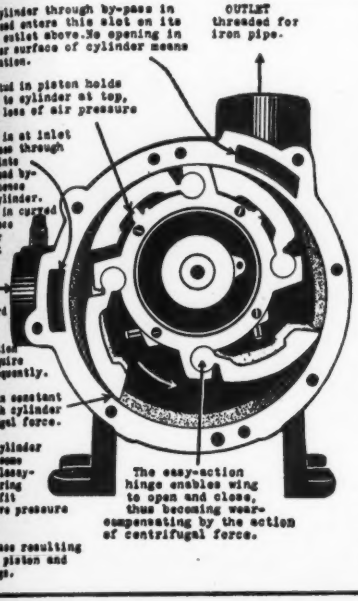


Manufactured by

AUTO MOULDING & MFG. CO.

2326 S. CANAL ST. CHICAG

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HIGH PRESSURE BLOWERS AND VACUUM PUMPS

GAS BOOSTERS
AIR MOTORS

For Gas Furnaces -- Blow Pipes -- Oil Burners -- Gas Machines -- Atomizing -- Agitating -- Vacuum Printing Frames -- Paper Feeding -- Bottle Filling -- All Automatic Devices.

SENT ON TRIAL!

They Take Up Their Own Wear

LEIMAN BROS. 168-3K Christie St. NEWARK, N. J.

Makers of Good Machinery For Fifty Years

INTEGRITY!

T R & S Rivets are the last word in dependability nd uniformity. And they're backed by the long-tablished integrity of the Tubular Rivet and Stud ompany. So remember — for complete confidence n your production charts — specify only T R & S ivets.



TUBULAR RIVET & STUD CO.

World's Largest Manufacturer of Tubular and Split Rivets

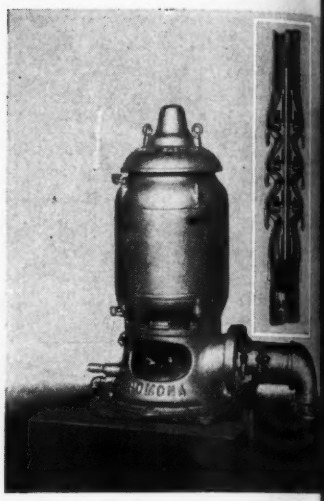
WOLLASTON, MASSACHUSETTS

R&S C

Pomona Redesigned 6-In. Medium Capacity Vertical Turbine Pumps

The Pomona Pump Co., 601 E. Commercial St., Pomona, Calif., announces the complete redesign of its line of 6-in. medium capacity vertical turbine pumps. As a result of improved engineering practice, particularly in the newly designed impellers and seats, the manufacturer states that the new models afford higher efficiency and better performance than the older model pu

For a desired capacity of 100 g against 110 ft. lift in a well and 50 pressure above, a 7½ h.p. motor i



Pomona Redesigned 6-In. Medium Capa Vertical Turbine Pump for 100 G.P.M. C city at a Given Head. Insert: Cross Sec View of Pumping Stages, Showing Newly signed Impellers and Seats.

quired with a new model pump against a 10 h.p. motor with an model pump. The efficiency of this p ticular size pump for this head ca city has been increased 6½ points a the number of stages has been redu one-fourth. Other advantages of the designed pumps, making for extrem low operating costs, lie in the fact th the pumps are water-lubricated, with

SAWS *for*

PISTON RING SLOTTING

All Types of

CIRCULAR METAL CUTTING SAWS for

Use in the Manufacture of

PISTON RINGS

Let Us Quote Prices

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Over 4,000 Shapes, Cuts and Sizes

American and Swiss Patterns



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CARSON-NEWTON CO

61-71 MILL ST. • BELLVILLE N

ABRASIVE BELT SURFACER



Vertical to Horizontal

or adjustable to any position between

in a Few Seconds

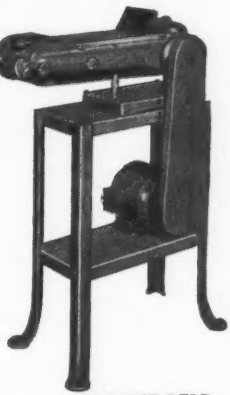
Step up your production polishing with this new, compact Abrasive Belt Surfacer.

Work or belt table is 15" long x 6" wide. Vacuum cleaner bag may be attached to exhaust connections. No dust—no dirt.

Other types and sizes using 4" to 20" wide abrasive belts.

Write for folder.

Also Centerless Feed Cylindrical Polishers and Reed Sensitive Drills.



ABRASIVE BELT SURFACER No. 608

PRODUCTION MACHINE CO. **GREENFIELD MASS.**

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Sweeping Success

ockford Spring-Loaded ch controls transmission of er in the Austin-Western eper illustrated . . . a sweeping ess in helping to make operation oth, easy, dependable. Rockford tches, in Spring-Loaded or Over-ter types, provide highly satisfactory ch control for numerous and varied s of equipment. The Spring-Loaded ch operates like an automobile clutch; Over-Center locks in or out of engage-nt. Write for information.

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Pullmore Disc Clutch for 1 to 75 h.p. at 500 r.p.m.

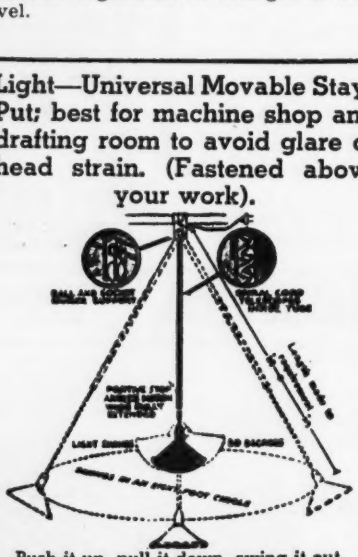
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stuffing box below ground level; the specially designed semi-open impeller can be adjusted from the surface for wear and for changing capacity, and the pumps are non-sandlocking and non-gaslocking.

Constructed of high quality bronze, the Pomona semi-open impellers operate in a cone-shaped seat in the pump bowls. Correct curvature of the impeller vanes is said to assure maximum lifting capacity and to prevent overloading of motor regardless of changes in water level.

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Push it up, pull it down, swing it out, swing it around, it stays put.

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Forest City Tap and Reamer Aligner

The illustration shows a tap reamer aligner which has been de by the Forest City Bit and Tool



Forest City Tap and Reamer Aligner

pany, Rockford, Ill. The tool is si be simple in operation, effective, accurate. The tap holder is made high grade tool steel, the sleeve is ened and ground, and the jaws are of special tool steel, specially proce The aligner or holder is made from grain cast iron and the hole and are machined accurately to assu perfect tap alignment.

To operate, a hole of tap size is dr

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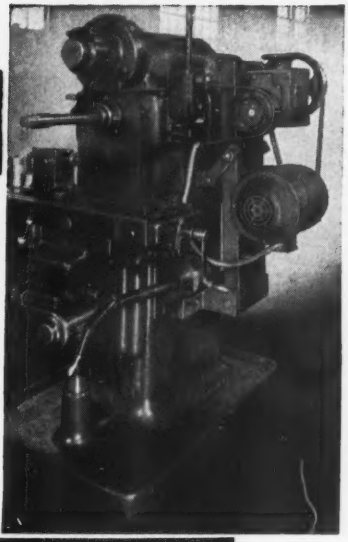
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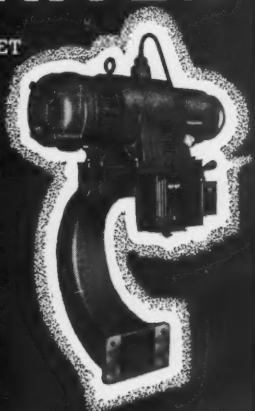
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Compactness is a superior feature of LIMA Gearshift Motor Units. Counter shafting and the necessity of shifting belts on cone pulleys is eliminated. Shifting is done with one lever, which can be extended to any position that is convenient to the operator.

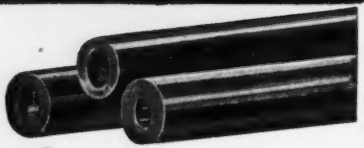
The belt driven units are designed to drive machines requiring from 1 to 25 H. P., adaptable for either flat or V type belts. The direct motor driven units are constructed in sizes 1 to 25 H. P. Mounting brackets available for all types of machines.

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and the tool is set over the h shown in the illustration. Wi aligner in position, the operation tap is the same as for any tappi excepting that the aligner elim loss of time in squaring the t perfect alignment.

The aligner is available in thre as follows: No. 1, 1/16 to 5/ square; No. 2, 5/32 to ¼ in. squar No. 3, 3/16 to 5/16 in. square.

"Mercury" Counter

A small electric counter to be h as the "Mercury" is announced b Production Instrument Co., 710 W. son Blvd., Chicago, Ill. The counte a very small energy requirement proximately two watts at rated vol a feature which is said to ensure

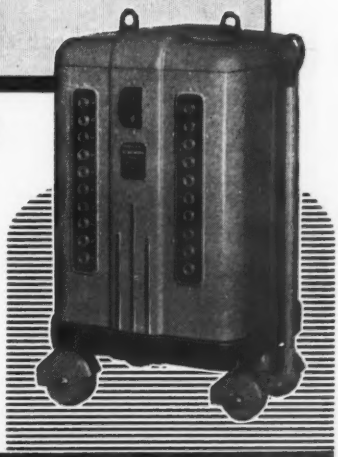


"Mercury" Counter

life to switch contact points an make the instrument particularly s for electric eye operation. The co is designed to record 600 counts minute.

Tamper-proof construction, non- feature, totally enclosed assembly, size, convenient mounting, and at tive appearance are features which said to make the Mercury Counter for built-in applications. The instru is carefully designed and well built. case and frame of cadmium-plat steel with unbreakable plastic wind form a complete enclosure. Five n ber wheels record up to 99,999 and peat. Large white figures on b

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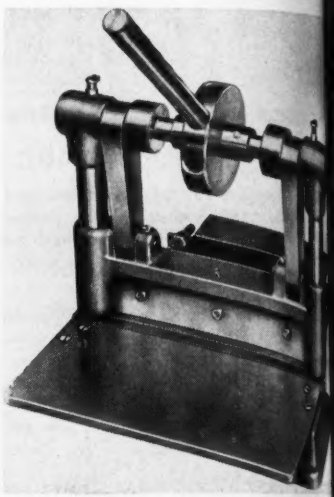
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wheels are located close to the window for easy reading.

The Mercury Counter is available for any 60-cycle a.c. voltage up to 230 volts and for any d.c. voltage up to 115 volts.

Micro Bench Shear and Bench Brake

In connection with the Micro Bender which was announced in the August, 1940, issue of MODERN MACHINE SHOP, the two tools shown here—ucts of O'Neil-Irwin Manufact Company, 316 Eighth Ave., South, neapolis, Minn.—can be used for



Micro Bench Shear

economical forming or bending of sm lots of parts. The three machines w developed by the manufacturer or nally for use in his own plant to eli nate the expense of making blanking forming dies on small lot jobs and h proved so successful that they are n being offered to the trade.

The Micro Bench Shear is designed meet the need for a precision sh between the heavy floor type foot-op ated shear and the small thumb o finger-operated "tinsmith's" shear. can be set for accurately trimm

The M-B "Utility" Pneumatic Grinder. Model U.--T. R.

A 60,000 R.P.M. Unit



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Here's a Real Spring Winder!

No. 1 Capacity 0 thru 3/32" wire, $1.25
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The HJORTH Perfection Spring Winde offers the ideal means of winding exte sion, compression, torsion, taper, doub taper, or left hand springs. Try one i your shop. You'll like it and the pri is reasonable.

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CUTTER GRINDER
curate inexpensive unit for sharpening ite-lip engraving and routing cutters.

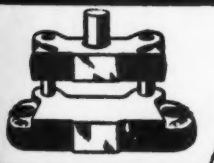
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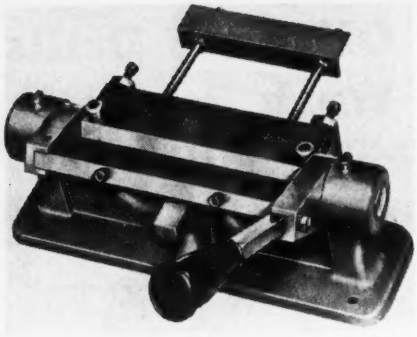
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Micro Bench Brake

metal stampings for die duplicating work and shearing material to die duplicating size from stock sheets. The working table can be drilled and tapped for precision gages for die substitute and semi-production work. It is made of steel plate and can be replaced from stock material whenever required. Adjustable material guides are provided for accurate shearing to a tolerance of 0.001 inch.

The design of the shear allows circular and irregular-shaped materi be sheared where only part of the is to be trimmed. The interfering terial may be left free of the bla shearing from around the ends o shear. Adjustments are provided adjusting the clearance between s ing blades. Clearances may be se shearing ordinary material to extr close tolerances without buckling knurling and for "hairline" shearin very light materials.

Maximum shearing width of the s is 6¼ in. Maximum shearing capa full width, is 24-gauge steel plate in. width, 18-gauge steel plate. weight, 25 pounds.

The Micro Bench Brake is a prec die substitute machine for metal d cating and creating angle and cha materials from sheet and strip s Angle and channel materials ma formed in sizes from ⅛-in. dime upwards. The brake will also angles, brackets, vees, and any type of folding to 110 deg. of radii brake covers the folding range of between that done on the floor brake and that usually performed a hand-operated vise or pinchers.

Folding operations are completely



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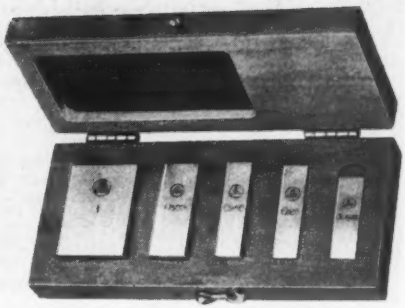
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3 PARK PLACE NEW YORK CITY

...e to the operator, allowing him full ...lding control and inspection over his ...rk. Complete horizontal and vertical ...justment of the folding plate is pro...ded for accurately setting to form ...ther acute or obtuse angles of natural ...dii over the entire material capacity ...nge of the machine. Accurate folding ...ops are provided for duplicating all ...lding operations to a tolerance of ...01 in. Material guides can be quickly ...justed for accurate metal duplicating ...d rapid folding of sheet material and ...rip stock on a semi-production basis. Maximum folding width of the brake ...6 in. Maximum folding capacity, full ...idth, 18-gauge steel plate; 4-in. width, ...-gauge steel plate. Weight, 25 pounds.

"Mechanic's Own" Ultra-Chex Set

The George Scherr Company, Inc., 122 Lafayette St., New York, N. Y., announces the addition of the "Mechanic's Own" set to its line of Ultra-Chex precision length standards. Designed as a unit for the toolmaker's and mechanic's tool boxes, this small five-block set is said to enable the individual mechanic to produce a given tool, fixture, jig, gage, or workpiece with the assurance that the result will be correct to specified accuracy limits.

The "Mechanc's Own" set consists of five gage blocks accurate to eight millionths of an inch, and finished to the following dimensions: 1, 0.500, 0.250, 0.125, and 0.625 inch.



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Savage Tube Cutting Nibbler

The Savage Tube Cutting Nibbler illustrated herewith has been designed by W. J. Savage Company, Knoxville, Tenn., for fast and accurate tube cutting. The capacity of the machine is ⅛ in. in mild steel.

Tubes from 4 to 36-in. outside diameter can be cut, trimmed and shaped by the use of a guide template following a scribed line or by free hand cutting. A combination of inside and outside cutting of tubes, cutting flat sheets, and circular cutting are said to be an innovation in the field of nibbling machines.

Features of the machine include a powerful direct-over-center drive, totally enclosed revolving head, patented head operating mechanism. Tube cutting attachments for slotting, trimming, and shaping tubes from 1 to 3½-in. inside diameter, of wall thicknesses up to $\frac{3}{16}$ in., can be furnished as extra equipment for the Nos. 236 and 3 Standard Savage Nibblers.



Savage Tube Cutting Nibbler

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A V-belt variable speed transmissio to be known as the "All-Speed" h been introduced by the Standard Tra mission Equipment Company, 416 We Eighth St., Los Angeles, Cal. The spe selector operates on the variable pul principle and consists of two interlock ing pulleys mounted on a common shaf The variable speed spindle can be pi oted laterally between the motor a the driven machine to provide new ru ning diameters on the interlocking pu leys. The selected speed is maintaine by means of a lock nut on the contr quadrant, and the obligue slot whi automatically and positively guides th spindle at all times ensures perfect be

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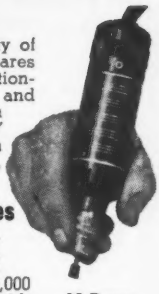
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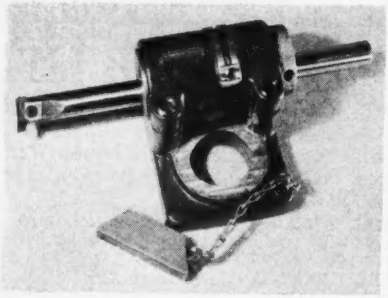
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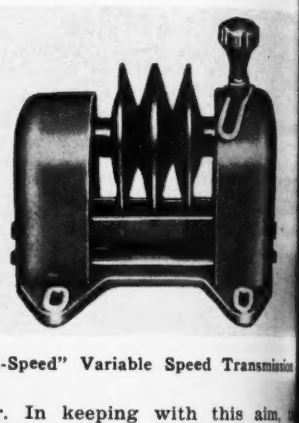


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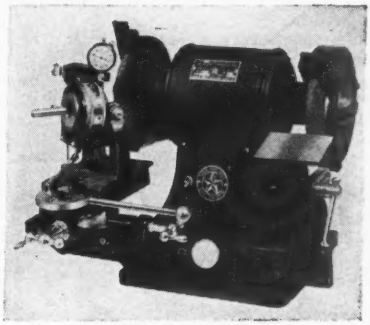
...new KENNAMETAL Chart No. 5 enables the machine tool operator to quickly determine what Horse Power will be required for a given feed, speed and depth of cut; or, conversely, what feeds, speeds and depths of cut are possible with the H.P. available. Copies sent free on request.

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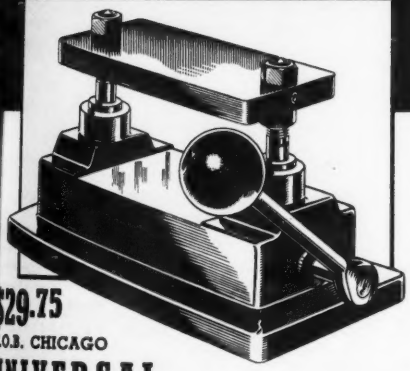
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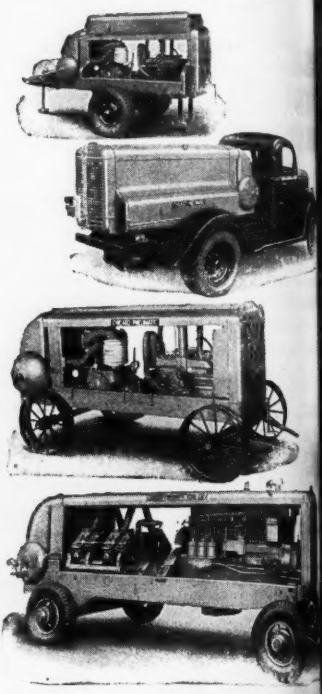
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The engine speed varies automatically in direct proportion to the demand for air between 50 and 100 per cent of the compressor output. When the demand for air falls below half-capacity, the compressor is unloaded by holding open the inlets valves, while the engine continues to run at half speed. When the air consumption increases, the compressor reloads at half speed and then continues to operate at a speed required to meet the demand. This system, it is claimed, assures full load economy down to 50 per cent, and eliminates wasteful idling and frequent loading and unloading of the compressor. As a result, appreciable saving and long... are said to be effected.

The CP Class PO-8 Compressor...



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an actual capacity of 500 cu. ft. ... minute and a maximum discharge ... sure of 125 lb. The unit is equi... with eight cylinders, the low pre...

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T is for the TOUGH alloy steel used to make them.

H is for their HARDNESS—scientifically correct.

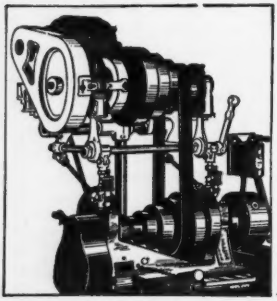
O is for the OLD AGE which Thor Stamps reach in use.

R is for the ROUGH treatment they'll take.

Send for samples — today.

The Pittsburgh Stamp Co.

812 CANAL ST. • PITTSBURGH, PA.



Speed Up! End "Bottle-necks!

Remco Motor Drives provide the right speed for each ... Make your tools independent of line shaft location and ... ation. This scientifically engineered Remco Drive takes ... motor of reasonable size—new or USED. Motors chan... instantly in case of a "burn-out." Write! Remco Prod... Corp., State and Hay Sts., York, Pennsylvania.

REMCO MOTOR DRIVE

for LATHES, SHAPERS, DRILLS, MILLING MACHINES, ...

SMALL THINGS TO DO THAT WILL HELP YOU AVOID HEADACHES . . .

ORDER THAT NEXT LOT OF JIG BUSHINGS FROM ACME

Because:

You can choose from a complete stock of both A. S. A. and Acme Standards.

They are easy to select from our catalog.

You can order by 'phone.

They arrive promptly and thus avoid delays in your shop.

ACME INDUSTRIAL COMPANY

Office 4122 212 N. Laflin St., Chicago, Ill.

Mark It Quickly with a NUMBERALL

Made with 1 to 10 wheels. Stamp in perfect alignment. Shank for Hand or Press Stamping. Platform for stamping Name Plates and other small articles.



No. 45 Platform

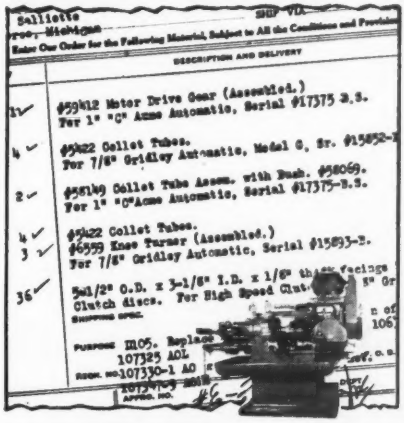


NEW Quick Set Machine. One wheel can be turned quickly by knurled knob for consecutive numbering.

NUMBERALL STAMP & TOOL CO.

Huguenot Park, Staten Island, N. Y.

Orders Calling For


Salliotte
Enter Our Order for the Following Material, Subject to All the Conditions and Provisions
DESCRIPTION AND DELIVERY
1✓ #59K12 Motor Drive Gear (Assembled.) For 1" "C" Acme Automatic, Serial #17375 B.S.
4✓ #5K22 Collet Tubes. For 7/8" Gridley Automatic, Model C, Sr. #15852-B
2✓ #58K49 Collet Tube Assem. with Bush. #58K69. For 1" "C" Acme Automatic, Serial #17375-B.S.
4✓ #5K22 Collet Tubes.
3✓ #6K59 Knee Turner (Assembled.) For 7/8" Gridley Automatic, Serial #15893-B.
36✓ 3 1/2" O.D. x 3-1/8" I.D. x 1/8" thick Facings Clutch discs. For High Speed Clutch
PURPOSE MOS. Replace 107325 AOL
REMK. 107330-1 AO

A Wide Variety of

SCREW MACHINE REPAIR PARTS

. . . are received constantly by the Modern Collet and Machine Company. Items such as motor drive gears, tool slide guides, spools, knee turners and many other screw machine parts which require replacement are listed. These orders are filled promptly . . . and parts are furnished that always equal or excel original equipment standards.

The next time you need *any* screw machine repair part, get in touch with your Modern Collet representative or write directly to the factory. It may surprise you to find how many of even the "hard-to-find" parts can be supplied to you at moderate cost and without delay.

WRITE FOR OUR NEW CATALOG.

MODERN COLLET AND MACHINE CO.

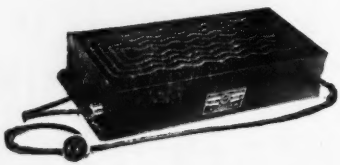
401 Salliotte St. Ecorse, Mich.

cylinders having diameters of 8⅜ in. and the high pressure cylinders diameters of 4¾ in. Stroke of the cylinder is 5 in.; speed is 1,000 r.p.m. The engine has six cylinders with bores of 5¾ in. and stroke of 8 in. Speed of the engine is 1,000 r.p.m., and maximum horsepower at this speed is 132.

When mounted on steel or pneumatic tires, the Class PO-8 compressor is 15 ft. 4 in. long, 7 ft. 6 in. wide, 7 ft. high, and weighs net 13,300 lb. Skid mounted, the compressor is 15 ft. 2 in. long, 5 ft. 1 in. wide, 5 ft. 6 in. high, and weighs, net, 11,700 pounds.

"NEW D & W"
MAGNETIC CHUCKS

Styles 7 x 17 and 6 x 13



Developed to meet demand for chucks lower than our standard style.

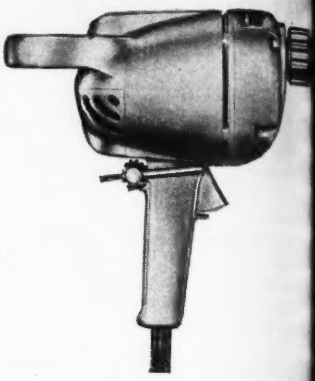
Send for folder covering Chucks and Demagnetizers.

J. & H. ELECTRIC CO.
202 Richmond St. Providence, R. I.

Skilsaw ½-In. Drill

A ½-in. drill of compact design, weight, and 100 per cent anti-fr bearing construction has been nounced by Skilsaw, Inc., 5037 Ave., Chicago, Illinois.

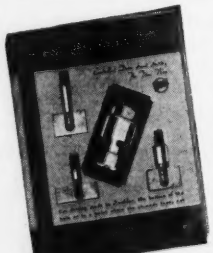
The Skilsaw Model 80 Drill w



Skilsaw ½-In. Drill

only 8 lb., and is only 11½ in. long o all and 9¼ in. high. Its attrac streamlined design is an important tor in achieving the perfect balance means easier handling of the drill in positions. Its compact construc makes the drill ideal for use in t places. The die cast body combi increased strength with lighter we Every moving shaft is mounted on t tion-free ball or needle roller bearin and helical-cut gears ensure smo performance. The two-pole safe switch has 100 per cent overload pacity.

A powerful universal motor prov for faster drilling. The Model 80 ha



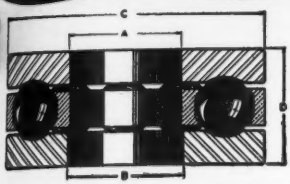
If it's STUD SETTING—It's our SPECIALT

We can supply the proper tool for all sizes and types stud setting—from 4-40 to 3" and larger if needed. To that are designed for small lots or large, for all stand and special types of studs, electric, pneumatic, machi tool or hand drive.

Send us a sample stud or sketch • for practical suggestions •

TITAN TOOL COMPANY • FAIRVIEW, P

GWILLIAM



TYPE GB GROOVED RACES

BALL THRUST BEARINGS

STANDARD SIZES OR SPECIAL DESIGN to your specifications; send sketch or worn sample, regardless of condition, for quotation, without obligation. • Our complete catalog will help you in making selection of bearings—shall we send it?

THE GWILLIAM CO.

358 Furnam St., Brooklyn, N. Y.



Free Cutting!
Non-Glazing!
Abuse Proof!

New WTTCo
Diamond Impregnated
WHEEL DRESSER

Whole, natural diamonds of high quality and extreme toughness are spaced regularly throughout the matrix to give great accuracy, uniform dressings and to hold wheel to size. These stones are anchored permanently in their matrix by strong chemical bonds that will not break under heat, pressure or rough abuse. No remounting! Lowered costs! After tool is put in machine it will give best results if left in original position. It is not necessary to turn or alter the area in contact with the grinding wheel.

Send for literature and prices.

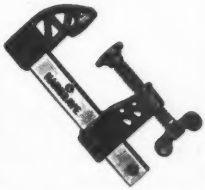
WHEEL TRUEING TOOL CO., INC.
3200 W. Davison • Detroit

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A CLAMP For Every Purpose







Forged Steel
Quick Acting
Deep Reach
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Sizes Available:
¾" to 10' opening
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Write for CATALOG and PRICES on Clamps for all purposes as well as many other tools for use in the Machine Shop.

IN STOCK AT YOUR SUPPLY HOUSE

The Cincinnati Tool Co., **1947 WAVERLY AVE., CINCINNATI, OHIO**

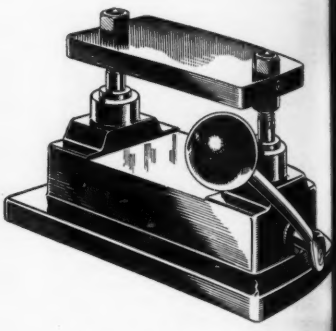
no-load speed of 450 r.p.m. and a full-load speed of 300 r.p.m. Its drilling capacity is ½ in. in steel and 1¼ in. in hardwood.

Mohr Universal Drill Vise

Mohr Lino-Saw Company, 126 North Union Ave., Chicago, Ill., has put on the market a Universal Drill Vise which is said to effect remarkable savings in time, tooling and drill fixture costs.

Adaptable for a wide variety of drilling operations, this device is said to unusually simple in manipulation. slight pull on a ball handled lever the work securely in place; work is leased by moving the lever in the op site direction. Complicated adjustme screws, bolts, or nuts, requiring tig ening or loosening are said to be tirely eliminated.

The Mohr Universal Drill Vise is



Mohr Universal Drill Vise

ported to be entirely practical for as a standard drilling jig. By usi drill bushing plates and adaptors, t vise may be used for a wide variety drilling operations where maximum curacy is essential. This is said to ma possible large savings in drilling tures, since it is only necessary to ca a stock of relatively inexpensive bus ing plates and adaptors.

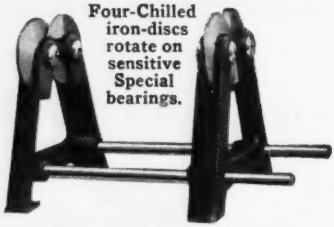
The Mohr Universal Drill Vise is 9 long x 5 in. wide over base and weig approximately 14½ lb. The bushi plate is 6¼ x 3 in. and is furnished standard equipment. Plates and ada tors to meet an almost unlimited varie of purposes are available. A 40-to-1 co

Improved Anderson **Balancing Ways** *No Leveling Required*

A simple and excellent device for balancing, straightening and trueing.

They are made in the following sizes:

Swing	Greatest Distance Between Standards	Capacity in lbs.
20 in.	20 in.	1,000
40 in.	30 in.	2,000
60 in.	30 in.	2,000
72 in.	66 in.	5,000
96 in.	88 in.	10,000

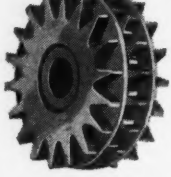


Four-Chilled iron-discs rotate on sensitive Special bearings.

Write for Full Information

Made by **Anderson Bros. Mfg. Co.**

1926 Kishwaukee St. Rockford, Ill.



Here's how to get real value from your grinding wheels. Dress and true them regularly. Use Vincent Improved Huntington dressers equipped with Vincent **high-carbon tool steel cutters.** Your mill supply distributor can supply them, and they cost no more than the ordinary kind.

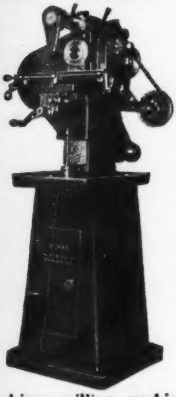
Insist on the dresser with the aluminum finish.

Write for descriptive catalog sheets.

THE VINCENT STEEL PROCESS CO.

2424 BELLEVUE AVENUE DETROIT, MICHIGAN

BURKE Milling Machines



No. 4 Motor Driven Milling Machine

Mounted on Cabinet Column

...ke motor driven milling machines Nos. 1, 2, 3, and 4 are specially suited for handling ...all, difficult work on a production basis.

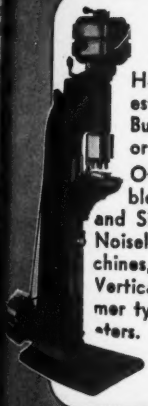
Write for complete information.

BURKE MACHINE TOOL CO.

...7 E. 16th St. Conneaut, Ohio

GRANT

Noiseless Spinning Riveters



2 to 6 Spindles

Head rivets from smallest to 3/16" diameter. Built with automatic trip or foot operation.

Other types include Double-Spindle Horizontal and Single-Spindle Vertical Noiseless Rivet Spinning Machines, and Single-Spindle Vertical Hammer type Riveters.

WRITE FOR FOLDER

The GRANT MFG. & MACHINE CO.

96 Silliman Ave.
BRIDGEPORT, CONN.



WET GRINDERS

eliminate the need of dust collecting systems as required by most states, as the dust and grit is carried away with the water. A separator returns the clean water to the pumping compartment.

Hisey Wet Grinders are made in double end machines with water supply to both wheels (as shown) single end wet and with one dry and one wet wheel.

Made for 10, 12, 14, 16, 18, 20 and 24 inch diameter wheels. Pump is self-priming. One motor drives both pumps and wheels through V belts. Any available motor may be used.

Write for Catalog 50MW

THE HISEY-WOLF MACHINE CO.
Cincinnati, Ohio

pression ratio is maintained. Leader pins run in hardened steel ground bushings.

Stanley Soft Face Hammers

Stanley Tools, New Britain, Conn., has developed a line of soft face hammers for use on assembly jobs requiring a hammer which will not mar finely finished surfaces or delicate machine parts. The tips are made of "Stanloid," a tough, resilient, nonmetallic substance, and the hickory handles are securely wedged in a steel center body.

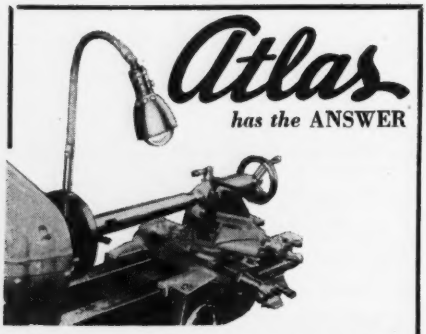
Various shaped tips, including regular face, ball pein, cross pein, straight pein, offset pein, square tip, and regular face with brass insert, make these hammers ideally suited for mechanics, machinists, sheet metal workers, motor builders, service men, and workers in defense industries. All tips are renewable.



Stanley Soft Face Hammers

Silver King Streamlined Mechanical Counter

The Production Instrument Company, 702-12 W. Jackson Blvd., Chicago, Ill., has developed a mechanical counter which has been aptly named the "Silver King." Departing abruptly from conventional design, each operating function has been thoroughly studied and perfected. Heavy number wheels are replaced by Bakelite, reducing by 85 per cent the weight that must be started and stopped with every count. The steel base and covers are said to establish new standards of permanence and rugged strength. Unbreakable windows of reinforced plastic material are streamlined to avoid shadows.



for faster production required today in all machine shops. Localized, high intensity VIMCOLIGHTING speeds up the job with greater accuracy. The VIMCOLIGHT will solve the lighting problem on any machine! Write now for complete details.

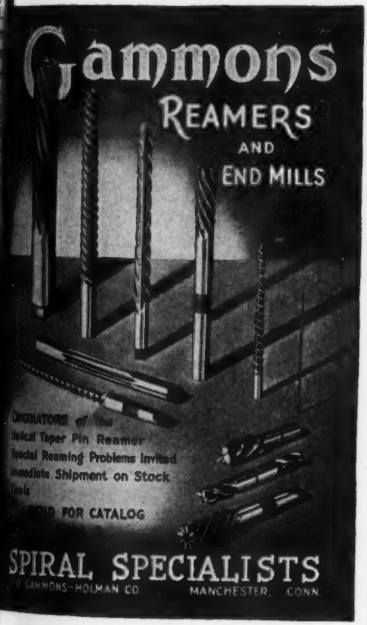
VIMCOLIGHT
VIMCO MANUFACTURING CO.
[illegible] CHENANGO ST. BUFFALO N. Y.

T. H. LEWTHWAITE MACHINE CO.
PUNCHES CUTTERS
BENDERS
SPECIAL TOOLS
PUNCHES and DIES for round, square and other shaped holes. Catalog sent on request.

317 EAST 47TH ST. • NEW YORK CITY
Wickersham 2-7164



DRILL JIG
COLONIAL
BUSHINGS



SPIRAL SPECIALISTS
THE GAMMONS-HOLMAN CO. MANCHESTER, CONN.

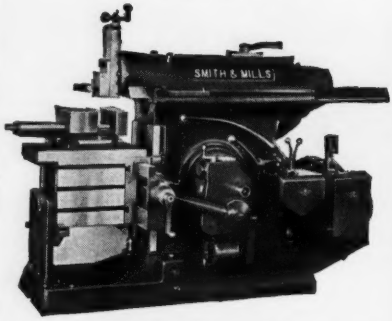


NEW USES REPORTED FOR THE "T" SURFACE GRINDER

Nearly every user reports some new and different uses for the Builders "T" Surface Grinding Machine — and agrees that it is one of the handiest machines in the shop. If you will write us, we'll gladly cooperate in finding out whether or not the "T" is suited for the particular grinding job you have! Ask for Bulletin N644, too.

BUILDERS . PROVIDENCE
IRON FOUNDRY RHODE ISLAND

SMITH & MILLS SHAPERS



Automatic lubrication—forced feed. Multiple disc clutch and brake. Quick feed changes. Direct reading feed and stroke dials. Power rapid traverse to cross feeds.

THE SMITH & MILLS CO.
CINCINNATI • OHIO

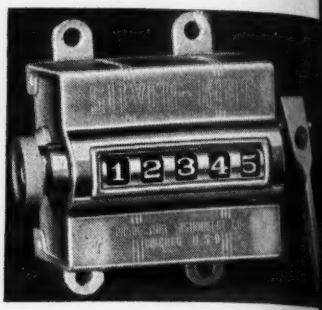
Why Use A Shaper to cut Keyways when a DAVIS KEYSEATER will do the job so much quicker and better?



Send for Circular

DAVIS KEYSEATER CO.
Exchange and Glasgow Sts.
ROCHESTER, N. Y.

Action of the Silver King is said to be so positive and effortless that first model on test counted at 60,000 hour, and on long runs at 36,000 hour. Although the Silver King is



Silver King Streamlined Mechanical Cou

designed for these tremendous spe they give an indication of the long at normal speeds.

Veeco Bow Pencil Compass

The Veeco Bow Pencil Compass sh in the illustration herewith has b placed on the market by the V. & Engineering Co., 758 South Fair Oa Pasadena, Cal. According to the manufacturer, the Veeco open truss design makes possible the construction of this large compass with a 40 per cent reduction in weight as compared to the older types of compasses previously marketed by the company. The instrument is constructed of steel except for the center screw thumb-piece and the handle, which are of dural. The center screw articulates with the legs by the use of cylindrical nuts. The legs bear upon a double-grooved hinge pin of broad base which is said to ensure strength and perfect alignment.



Veeco Bow Pencil Comp

MAXI-JR.-E.

...per Sensitive Drilling Machine

...small holes .004" to .250" diameter. ...-contained drilling unit swings radially ...column and locks to any position. All controls manually operated. 8" vertical adjustment of drilling unit with elevating screw.



Horizontal work capacity to center, 9½". Vertical work capacity, 10". Spindle speeds, 750 to 12000 r.p.m.

Write for catalog.

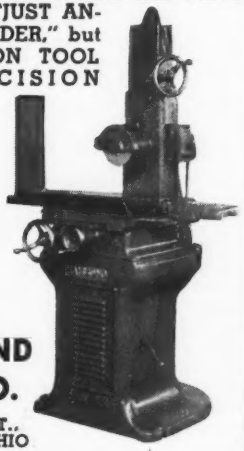
...E. MUELLHAUPT DIVISION

...E HAMILTON TOOL CO.

...E. DEE ST. HAMILTON, OHIO

PRECISION GRINDING

With THE HAMMOND 6"x18" HAND FEED SURFACE GRINDER. This machine incorporates a number of exclusive and desirable features which make it not "JUST ANOTHER GRINDER," but "A PRECISION TOOL FOR PRECISION WORK."



Circular and Complete Information Upon Request.

THE HAMMOND MFG. CO.

3091 E. 80TH ST., CLEVELAND, OHIO

QUICK DELIVERY! LOW COST!

The new Simmons Lathes feature the Micro-Speed Drive, an important fast-production asset. This Drive, contained in the cabinet leg, permits instant selection of an infinite variety of spindle speeds by the mere turn of a handwheel.

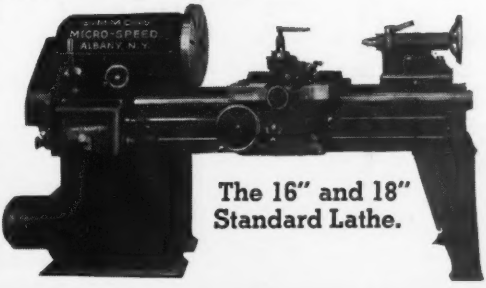
Timken Precision Spindle Bearings.

Snap levers for apron feeds.

Added Efficiency Under Heavy Loads.

...mmons Lathes are manufac...ured in 16", 18" and 20" stand...rd. 16"/25", 18"/27", 22"/34", ...0"/40", 26"/40" and 28"/50" ...ap beds in all bed lengths.

...OMPLETE SPECIFICATIONS UPON REQUEST. WRITE TODAY.



The 16" and 18" Standard Lathe.

SIMMONS MACHINE TOOL CORP.

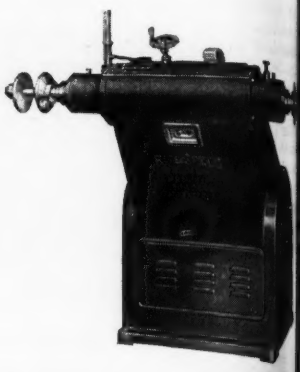
1745 Broadway, Albany, N. Y. Singer Bldg., New York City

The Veeco Bow Pencil Compass measures 6½ in. in length and will describe circles up to 10 in. in diameter. When the pencil lead and shoulder are replaced by the two points of durable and hard alloy steel which are provided, the instrument becomes an efficient divider. It is particularly well suited to various types of shop work such as pattern-making, tool and die making, sheet metal layout work, and so on.

Hammond Variable Speed Polishing and Buffing Lathe Model "VRO"

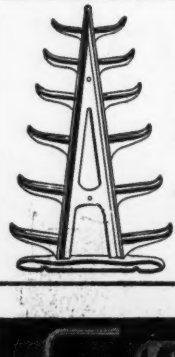
A variable speed polishing and buffing lathe to be known as the Model "VRO" has been added to the line of polishing and buffing lathes manufactured by Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo, Michigan.

The Model VRO has an overhanging spindle. The front section extends 12½ in. from the lower front of the base and is said to be especially desirable when polishing and buffing large, bulky pieces. Speed changes of between 1,500 and 30,000 r.p.m. can be obtained by turning the handwheel which is ble from the front of the machi



Hammond Variable Speed Polishi Buffing Lathe Model "VRO"

indicator provided at the side handwheel indicates the speed the lathe is running.



"CHAMPION" Steel Racks

Save time, steps and money by keeping bar stock, shafting and pipe out of the way and off the floor. *Write for full details.*

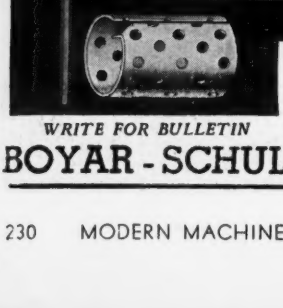
THE WESTERN TOOL & MFG. CO.
Springfield, Ohio

GRINDING WHEEL DRES

We make all types of Dressers and Cutters



DESMOND-STEPHAN MFG.
URBANA, OHIO
The Canadian Desmond-Stephan Mfg.
Hamilton, Ontario, Canada



LOWER LAPPING COST

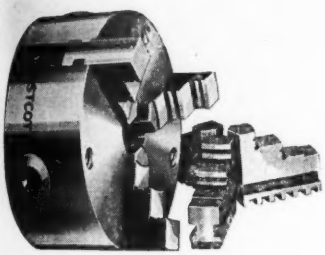
COPPERHEAD LAPS cost less than making to suit individual jobs. They last indefinitely of patented Replaceable COPPER SLEEVES.
Complete stock of all sizes from ⅛" to 2½" available quick shipment.

WRITE FOR BULLETIN

BOYAR-SCHULTZ CORPORATION
2120 WALN
CHICAGO

Westcott "Oneida" Universal Lathe Chucks

A line of universal lathe chucks to be known by the trade name "Oneida" has been announced by the Westcott Chuck Co., Oneida, N. Y. The bodies are of semi-steel and the jaws, scrolls, and pinions are heat treated, making the chucks well suited for general machine shop uses. According to the manufacturer, each chuck is guaranteed to center within 0.003 in. total indicator reading when new and is carefully tested before leaving the factory. All parts are precision made, with large bearing sur-



Westcott "Oneida" Universal Lathe Chuck

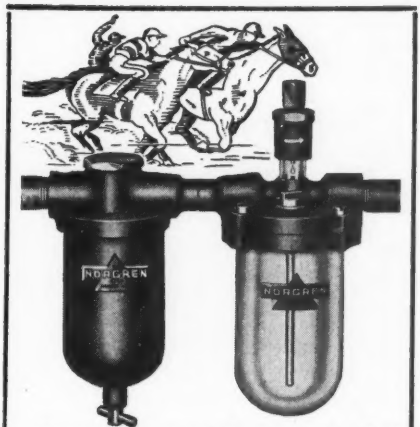
faces to provide accuracy and durability.

The jaws are of strong machinery steel, hardened and accurately ground after machining. The scroll is cut from special alloy steel, heat treated, and the spiral thread is ruggedly designed to withstand wear and strain. The pinion is of chrome molybdenum steel, heat treated after machining. The square socket in the large diameter face of the pinion is designed to resist rounding or breaking out.

The chuck is available in six sizes; 5, 6, 8, 10, and 12 in. Each chuck is supplied with two sets of jaws.

Themac 1400 Series Special Spindle Assembly for Themac Internal Precision Grinders

The drawing illustrates the design of the No. 1455-1463 special spindle assembly for internal grinding which is now being incorporated in the Types J-4, J-6E, and J-40 Themac High Speed Portable Electric Precision Grinders



Norgren Strainers and *Automatic* Sight Feed Lubricators beat the handicaps in air power. The strainer removes the dirt and 92% of the moisture. The lubricator conditions the tool (lubricates it *while running*) by injecting an *accurately controlled* oil fog into the air stream. Sold singly or in units. *Write for prices.*

C. A. Norgren Co., Inc.

216 SANTA FE DRIVE DENVER, COLORADO



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WHY?

Because Severance originated these cutters —offers the greatest variety of shapes in the widest range of sizes—Maintains the world's largest stock, assuring quickest possible delivery — of both standard and Special Ground H. S. Rotary Files.

Ground Cutters increase production by 50% minimum per hour.

Ground Cutters last three times as long (minimum) as Hand Cut or Mill Cut Rotary Files and can be reground many times.

Write for catalogue No. 12.

Severance Tool Manufacturing Co.

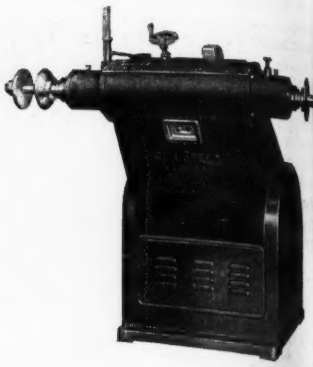
1516 East Genesee Ave. · Saginaw, Mich.

The Veeco Bow Pencil Compass measures 6½ in. in length and will describe circles up to 10 in. in diameter. When the pencil lead and shoulder are replaced by the two points of durable and hard alloy steel which are provided, the instrument becomes an efficient divider. It is particularly well suited to various types of shop work such as pattern-making, tool and die making, sheet metal layout work, and so on.

Hammond Variable Speed Polishing and Buffing Lathe Model "VRO"

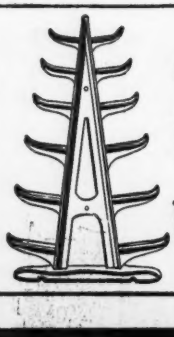
A variable speed polishing and buffing lathe to be known as the Model "VRO" has been added to the line of polishing and buffing lathes manufactured by Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo, Michigan.

The Model VRO has an overhanging spindle. The front section extends 12½ in. from the lower front of the base and is said to be especially desirable when polishing and buffing large, bulky pieces. Speed changes of between 1,500 and 30,000 r.p.m. can be obtained by m turning the handwheel which is acc ble from the front of the machine.



Hammond Variable Speed Polishing a Buffing Lathe Model "VRO"

indicator provided at the side of handwheel indicates the speed at w the lathe is running.



"CHAMPION" Steel Racks

Save time, steps and money by keeping bar stock, shafting and pipe out of the way and off the floor.

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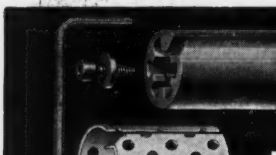
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The Canadian Desmond-Stephan Mfg. Co. Hamilton, Ontario, Canada



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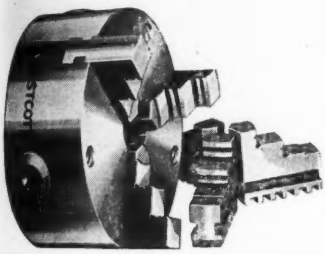
WRITE FOR BULLETIN

BOYAR-SCHULTZ CORPORATION

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Westcott "Oneida" Universal Lathe Chucks

A line of universal lathe chucks to be known by the trade name "Oneida" has been announced by the Westcott Chuck Co., Oneida, N. Y. The bodies are of semi-steel and the jaws, scrolls, and pinions are heat treated, making the chucks well suited for general machine shop uses. According to the manufacturer, each chuck is guaranteed to center within 0.003 in. total indicator reading when new and is carefully tested before leaving the factory. All parts are precision made, with large bearing surfaces to provide accuracy and durability.



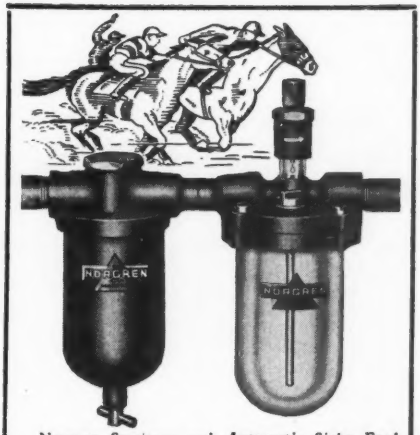
Westcott "Oneida" Universal Lathe Chuck

The jaws are of strong machinery steel, hardened and accurately ground after machining. The scroll is cut from special alloy steel, heat treated, and the spiral thread is ruggedly designed to withstand wear and strain. The pinion is of chrome molybdenum steel, heat treated after machining. The square socket in the large diameter face of the pinion is designed to resist rounding or breaking out.

The chuck is available in six sizes; 4, 5, 6, 8, 10, and 12 in. Each chuck is supplied with two sets of jaws.

Themac 1400 Series Special Spindle Assembly for Themac Internal Precision Grinders

The drawing illustrates the design of the No. 1455-1463 special spindle assembly for internal grinding which is now being incorporated in the Types J-4, J-6, J-6E, and J-40 Themac High Speed Portable Electric Precision Grinders



Norgren Strainers and *Automatic* Sight Feed Lubricators beat the handicaps in air power. The strainer removes the dirt and 92% of the moisture. The lubricator conditions the tool (lubricates it *while running*) by injecting an *accurately controlled* oil fog into the air stream. Sold singly or in units. *Write for prices.*

C. A. Norgren Co., Inc.
216 SANTA FE DRIVE DENVER, COLORADO



Severance GROUND
Govern the World Of
ROTARY FILES
WHY?

Because Severance originated these cutters —offers the greatest variety of shapes in the widest range of sizes—Maintains the world's largest stock, assuring quickest possible delivery — of both standard and Special Ground H. S. Rotary Files.

Ground Cutters increase production by 50% minimum per hour.

Ground Cutters last three times as long (minimum) as Hand Cut or Mill Cut Rotary Files and can be reground many times.

Write for catalogue No. 12.

Severance Tool Manufacturing Co.
1516 East Genesee Ave. - Saginaw, Mich.



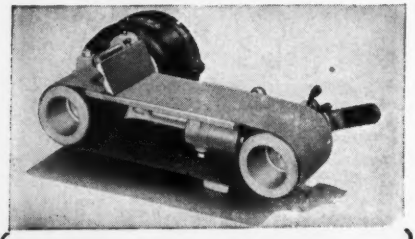
Themac 1400 Series Special Spindle Assembly for Themac Internal Precision Grinders

made by The McGonegal Manufacturing Company, Jones Bldg., East Rutherford, N. J. The spindle is made in nine variations, the difference being in the dimensions for the ball bearing mounts, threads on the ends, lengths of fit, and so on. Three ball bearings are used on this spindle. The spindles are of special SAE steel, heat treated and ground, and are mounted on SKF deep groove precision ball bearings with Textalite retainer. A labyrinth seal protects the front bearing.

"Ply" Industrial Skin Protection

An industrial skin protection to be known as "Ply" is now being marketed by the Milburn Company, 905 Henry St., Detroit, Mich., in a series of creams and ointments. These creams and ointments, according to the manufacturer, have been developed scientifically with a background of medical research upon the principle of applying an extra layer or coating of skin consisting of ingredients that are insoluble in the specific chemicals to be combatted.

Ply Industrial Skin Protection is available in three major classifications; namely Ply Nos. 1 and 2 which are applied like vanishing cream and Ply No. 6 of the ointment variety. Ply No. 1 is used for protection against dirty grease and oil (carbon black), paint in all forms, asphalt, tar, printing ink, greases, waxes, pitch, and so on; Ply No. 2 is used for protection against petroleum products, cooling lubricants, cutting compounds, and so on, and Ply No. 6 is used for protection against acids. "Ply" is easily removed by using soap and water in the usual manner.



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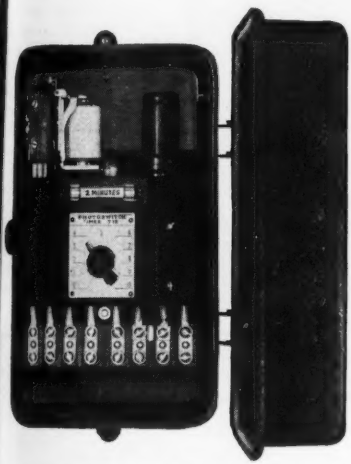
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Photoswitch Short Interval Timer

A short interval electronic timer which is said to be extremely accurate over ranges from 1/20th of a second to two minutes, to be known as the Type T15, is now being marketed by Photoswitch Incorporated, 21 Chestnut St., Cambridge, Mass. Control is accomplished through a specially designed snap-action relay of 1,000-watt capacity. The timer is flexible with reference to actuating control, permitting both momentary push button and sustaining contact control. It is universal for six



Photoswitch Short Interval Timer

timing ranges represented by timing valves snapped into a readily accessible clip.

According to the manufacturer, the Photoswitch Timer Type T15 has been designed with an accuracy which permits complete interchangeability of equipment. Thus, machine process calibrations for one timer apply to all timers. In addition, the unit is said to be constructed for unlimited life.

Barber-Colman Hobbing Time Calculator

A slide rule designed to simplify the calculation of hobbing time has been developed by the Barber-Colman Company, 207 Loomis St., Rockford, Ill.

NO "DOUBTFUL" SCREWS

TO PUT THE BRAKES ON *Mack* ASSEMBLIES





Mack Trucks, Inc. keeps assembly costs low with Parker-Kalon Self-tapping Screws

WHEN it comes to Self-tapping Screws, users have learned that the "doubtful few"—that small quantity in a lot which fails to function properly—can run up assembly costs tremendously. That's why Mack and thousands of other manufacturers know they save money and turn out more securely assembled products by insisting on Parker-Kalon Self-tapping Screws.

You avoid the "doubtful few" when you buy Parker-Kalon Screws because these Screws are made to high standards maintained and guaranteed by the famous Parker-Kalon Quality-Control Laboratory. Thus every Screw that comes from the modern Parker-Kalon plant works right and holds tight every time. No wonder over 100,000 concerns use these time-and-labor saving Screws today. Mail coupon for free samples to: Parker-Kalon Corp., 198 Varick Street, New York, N.Y.



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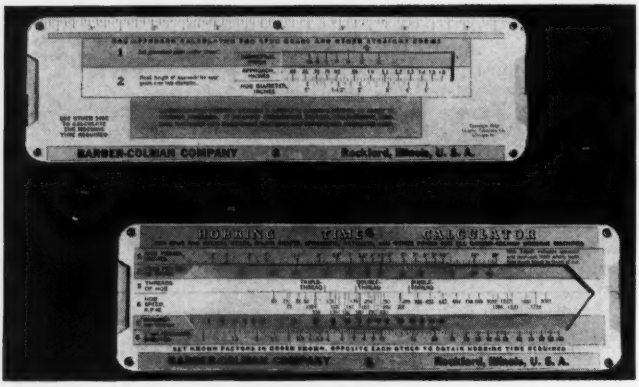
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Parker-Kalon Corporation, 198 Varick St., New York, N.Y. Please send us Free Samples of Self-tapping Screws.

Company.....

Address.....

City & State.....



Barber-Colman Hobbing Time Calculator

This time calculator is said to be a great improvement over the former calculator. One side permits the calculation of the "hob approach" for spur gears, spline shafts, and other straight forms. To obtain this dimension it is necessary only to set the diametral pitch under the arrow and read the hob approach in inches directly above the diameter of the hob used. This amount, when added to the length of the spline, or width of the gear face, gives the total length of hob travel which is used in calculating the hobbing time.

The hobbing time is very easily calculated by means of setting the two slides on the reverse side in the order indicated on the rule. The procedure is as follows: (1) Set the feed per revolution of work below the total hob travel on the first slide. (2) Then set the hob speed r.p.m. below the particular thread hob used (whether single, double, or triple thread) on the second slide. (3) Read the time required in minutes below the number of teeth being cut.

The rule contains all of the standard hob speeds that are found on Barber-



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24" HI-SPEED BAND SAW

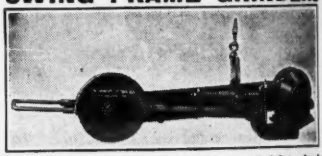
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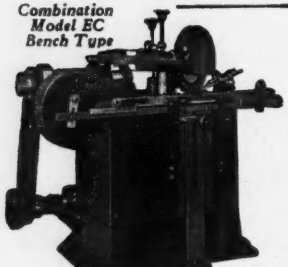
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The WARDWELL SAV-A-SAW automatically sharpens saws with teeth as fine as 32 to the inch at a speed up to 75 per minute. Savings on 2 gross of blades will pay for the machine. Assures keener cutting saws at extremely low cost.

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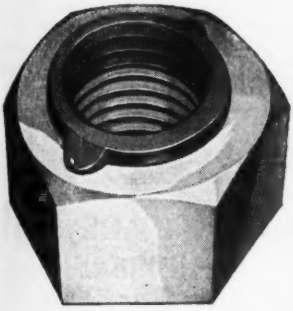
THE WARDWELL MFG. CO.

3166 FULTON RD. • CLEVELAND, OHIO

lman hobbing machines. In addition, l 8-in. scale is incorporated on one ge. By a slight amount of interpola- on on the hob speeds, the Hobbing me Calculator can be of equal value r determining hobbing times on other kes of hobbing machines. The calcu- tor is available, free of charge, to all ne estimators, production managers, perintendents, foremen, and so on, ho are concerned with hobbing prob- ms. Write direct to the Barber-Col- an Company, giving name of company d title.

"Security" Nut

A locking nut which, it is claimed, an be tightened up or backed part way f a bolt years after its application nd still retain its grip on the bolt is ow being manufactured by Security etal Products, Inc., 358 E. Kalamazoo ve., Kalamazoo, Mich. According to e manufacturer, the nut can be taken

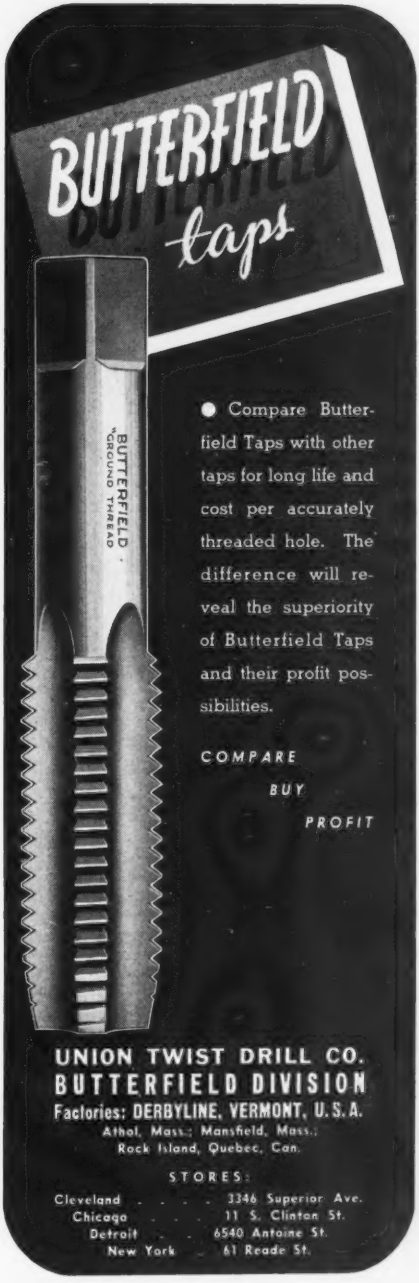


"Security" Nut

ff and reapplied many times without osing its gripping power.

The bolt-gripping element of the "Security" Nut consists of a slightly elliptical shaped spring-steel retainer permanently seated in the head of a standard nut. When the nut is applied, the retainer is distorted from an elliptical shape into a circular shape, thus setting up a powerful spring pressure between the bolt threads and the retainer threads. It is claimed that neither the threads of the bolt nor the threads of the retainer are injured when applying or removing the nut.

The Security Nut is started on a bolt with the fingers in the same manner as



an ordinary nut, and a wrench is used when the threads of the retainer commence to engage the threads on the bolt. The nut is said to fully meet thread-pitch tolerances of the National Screw Thread Commission.

New Books

The Microscope in Elementary Cast Iron Metallurgy. By Roy M. Allen. 160 pages, 6 x 9 in., 73 illustrations. Bound in brown waterproof cloth. Published by the American Foundrymen's Association, 222 W. Adams St., Chicago, Ill.

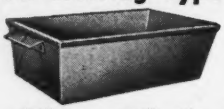
In this book, an enlargement of the material presented at a series of lectures at the 1939 Convention of the American Foundrymen's Association in Cincinnati, Ohio, the author has made a determined attempt to show the practical man that there is nothing particularly difficult about the fundamentals of metallurgy, the microscope, its use, nor the interpretation of photomicrographs.

The first section deals with the value of the microscope to the cast iron foundryman and continues with the fundamentals of physical cast iron metallurgy. In these chapters the auth uses simple analogies with which to p across his points. He then explains th behavior of sulphur and phosphorus i cast iron, how they can be identifi in the micro-structure, and their effec on the properties of the iron. Th fourth chapter deals with what is term ed special cast irons, such as white chilled, malleable, and alloy cast irons explaining variations in properties b use of photomicrographs.

In the second section, the author ex plains the value and use of equilibrium diagrams, beginning with an explana tion of simple binary diagrams and the proceeding to show how the same prin ciples can be applied to the more com plicated diagrams, particularly the iron-carbon diagram. Of special interes should be the equilibrium diagram b which the author proposes to explai the behavior of cast iron.

In the final chapter, the microscope and the technique of its use are dis cussed. The various parts of the micro scope and the function of each are ex plained. In addition, technique in focus sing, taking the photomicrograph photographic processes, photographic papers, etching reagents, and sample preparation are discussed. Various type

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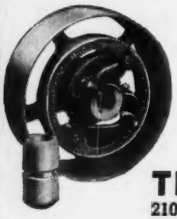
20" long x 12" wide x 6½" deep.
16 ga., drag holes and handles both ends.

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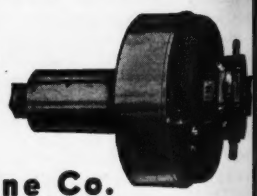
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EXPANDING "TYPE B"



Simplicity of construction, and large friction surface make this clutch ideal for many general factory installations. Especially recommended for countershaft, line-shaft, and other moderate speed drives.



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The Edgemont Machine Co.
2100 HOME AVENUE DAYTON, OHIO

of equipment for grinding, polishing, and photographing metals are shown. The book not only explains the procedures for securing, grinding, polishing, etching, observing, and photographing the sample, but also the interpretation of both what is seen in the microscope and in photomicrographs.

Lessons in Arc Welding, published by The Lincoln Electric Co., Cleveland, Ohio. 144 pages 6 x 9 inches; over 100 illustrations, including photos and drawings; cover, semi-flexible simulated leather, gold embossed. Price, 50 cents in U. S. A., elsewhere, 75 cents.

This book will be found helpful not only by beginners learning to arc weld but also by experienced welders, welding officials, supervisors, foremen, instructors, and others seeking a ready reference to fundamental information on arc welding and a guide to its proper application.

The book comprises a series of 51 lessons, based upon experiences of Arthur Madson, instructor of The Lincoln Arc Welding School and presenting the fundamental facts of welding.

Beginning with an introduction giving

Ordinary operators get positive accuracy with

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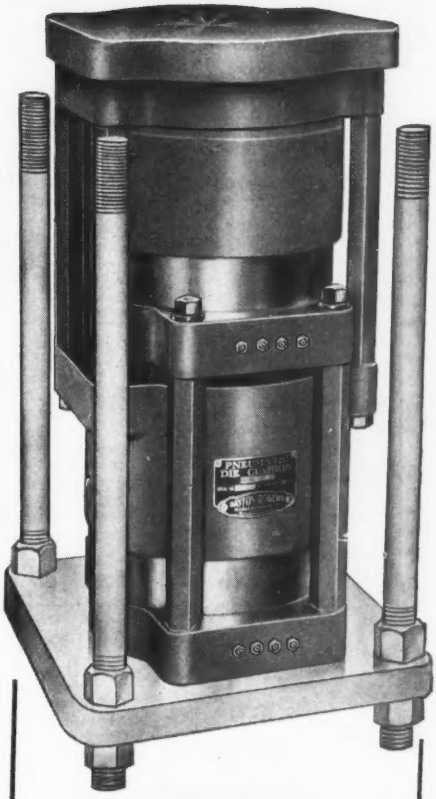
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preliminary instructions to the welder, including suggestions as to making and following a definite plan, learning the fundamental principles of arc welding, practicing continually, examining welds, criticizing and inviting criticism of work, wearing proper protective apparel at all times, and assuming proper working position, the 51 lessons are covered in four principal sections: Welding with Unshielded Arc Electrodes; Welding with Shielded Arc Electrodes; Electrodes for Particular Joints and Metals; Hardfacing.

Nineteen lessons comprise the instruction in use of unshielded arc electrodes, including the arc welding machine and its control, striking the arc and running horizontal bead, running straight bead, weaving, or movement of electrodes, effect of arc length, amperes and speed on bead; effect of polarity on bead, different electrode sizes and their uses, padding, building up plates, building up shaft, butt welds, lap welds, tee welds vertical lap, butt and tee welds, horizontal welds, horizontal joints, lap, overhead welding, overhead lap, butt and tee welding, expansion and contraction.

The nine lessons on use of shielded arc electrodes cover the shielded arc and its uses, running horizontal bead, butt welds with no vee and no backing, horizontal lap welds, tee and fillet welds, vertical welds, vertical, lap and fillet welds, overhead butt welds, overhead lap and fillet welds, penetration, and cutting.

Instruction in use of electrodes for particular joints and metals consists of 15 lessons, and eight lessons comprise instruction on hard facing. Text explanations are graphically supplemented by line drawings and photos for ready understanding.

A valuable feature of the book is the set of questions on each of the lessons, enabling the student to check his knowledge.

Science for Handcraft Students. By H. Morton, B.S., A. Inst.P. Published by Chemical Publishing Company, Inc., 148 Lafayette St., New York, N. Y. 149 pages, 156 illustrations. Bound in cloth.

In this volume the scientific principles of mechanics, hydrostatics, chemistry and electricity are related to their applications in everyday life and especially to workshop practice in wood and

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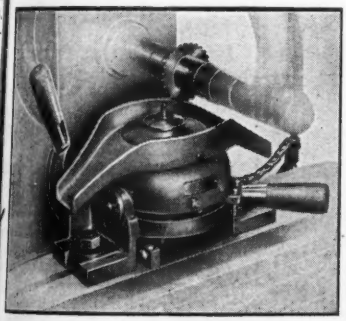


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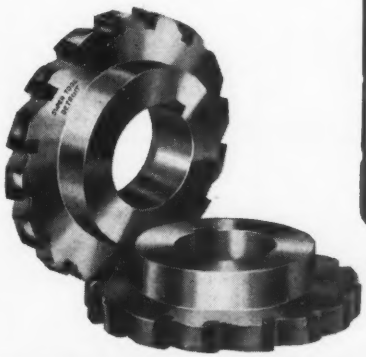


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See Catalog No. 40 Illustrating Special Tools, etc.



SUPER TOOL COMPANY
21650 HOOVER RD., DETROIT, MICH.

metal. Experiments have been included which can be performed in some cases with improvised apparatus, and in others with simple working models which can be constructed by the students. In many cases suitable dimensions have been given which help the student to become accustomed to the making of models and employing these models for illustrating scientific principles.

The book takes up, in turn, the subjects of measurements, parallelogram and triangle of forces, moments, friction and work, the conservation of energy, machines, elasticity, hydrostatics, heat, properties of materials, chemistry of air and water, the electric circuit, magnetism and electromagnetism and Ohm's Law and the heating effect of current.

Geometric No. 20 Chaser Grinder for use in the accurate resharpening of chasers both on the chamfer and on the cutting face is described and illustrated in a four-page bulletin prepared for distribution by The Geometric Tool Co., New Haven, Conn. Complete specifications are given. Copy free upon request.

Johnson Bronze Products Bulletin. A four-page bulletin containing information on Johnson Cast Bronze Plain Bushings and Bearings, Machine Bronze Bars, Leaded Bronze Electric Motor Bearings, and Self-Lubricating "Ledaloyl" Bearings and Bushings has been released by the Johnson Bronze Co., 590 S. Mill St., New Castle, Pa. Copy free upon request.

Trade Literature

Gisholt Performance Data Sheets No. 58 to 61, featuring case studies of jobs which find their counterparts in a large number of machine shops, are now available from the Gisholt Machine Co., 1219 E. Washington Ave., Madison, Wis. The studies include metal-turning operations on turret and automatic lathes and static-dynamic balancing on the Gisholt Dynetric Balancing Machine.

Each metal-turning installation story is an analysis summary of the machining of a part and is written in a manner that makes the data valuable to new

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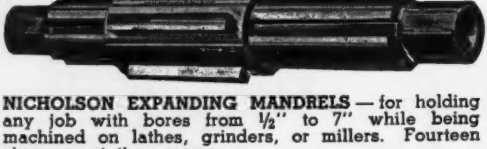
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operators as well as skilled machinists, foremen, engineers, superintendents, and executives. Operation sequence, feeds, cutting speeds, tolerances, and machining times are supplemented by tooling photographs and diagrams. The subjects of the stories are manufacturers of automobiles, oil well equipment, and industrial machinery.

The balancing data covers the procedure followed by a manufacturer of ventilating equipment in locating, measuring, and correcting unbalance in sirocco type fans. The methods employed for each step are described in detail. Data sheets Nos. 58 to 61 free upon request.

Aero-Thread Engineering Standards and Technical Information Bulletin T-1a. This 16-page bulletin, publication of Aircraft Screw Products Co., Inc., 25-12 41st Ave., Long Island City, New York, N. Y., has been prepared to provide data on standard sizes, basic formulas, and engineering information required for the application of Aero-Thread — a screw thread system in which a thread lining consisting of a precision shaped spring wire insert is employed between

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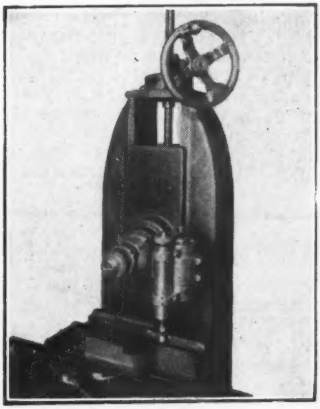
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the tapped hole and the mating screw. According to the manufacturer, the thread lining protects the tapped hole from wear and abrasion; provides an anti-friction surface between the mating threaded parts, thereby insuring smooth screw engagement, and permits the use of a shallow circular section thread groove on the screw or bolt, resulting in screw members of maximum static and dynamic strength. Copy of Bulletin T-1a free upon request.

Magnus Metal Working and Finishing Performance Data. A 48-page bulletin for the metal working and finishing industry is now being issued by Magnus Chemical Company, Inc., 10 South Ave., Garwood, N. J. The bulletin consists of a series of detailed performance reports from metal working plants of all kinds, outlining improvements and economies effected by the use of properly selected cleaning materials in comparison with formerly used materials and methods.

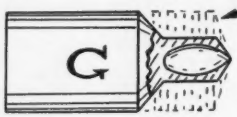
For convenience, the reports are arranged in a number of classifications, each involving a particular metal cleaning and finishing operation. The reports are full of useful and practical ideas that are said to speed production and meet rigid quality specifications. Copy free upon request.

Severance "Chatterless" Countersinks. Bulletin 12-E describing Severance "Chatterless" Countersinks, both the standard and heavy duty types, is now being issued by the Severance Tool Mfg. Co., 1516 E. Genesee Ave., Saginaw, Mich. Copy free upon request.

Pyott V-Belt Catalog V-500. Pyott Foundry & Machine Co., 328 N. Sangamon St., Chicago, Ill., has prepared a 112-page catalog on V-belt drive selection, making use of revised V-belt ratings. Designated as the V-500, the catalog features Pyott's copyrighted "Economy Tables," which enable drive users to select readily the most economical of the many drive arrangements that will do a given job. Also included are photographs of interesting, representative drive installations, belt and sheave price lists, a section on V-flat drives and several pages of engineering data.

Copy of Catalog V-500 will be sent free of charge to anyone requesting it on his company letterhead.

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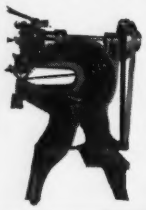
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Oilgear Twin Horizontal Broaching Machine. A twin horizontal broaching machine designated as the Type XB-12 is illustrated and described in an eight-page bulletin published by The Oilgear Co., 1320A W. Bruce St., Milwaukee, Wis. Dual push-button control, alternative toe-lever control, variable broaching speed, simple oil and electric circuits, hardened and ground ways, motor-driven coolant pump, and many other outstanding features of the unit are described in the bulletin. Copy of Bulletin 21000 free upon request.

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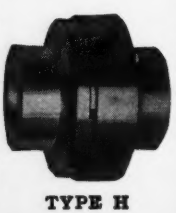
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U. S. Electrical Tool Catalog No. In this catalog, publication of The United States Electrical Tool Co., Cincinnati, Ohio, the complete line of electrical tools manufactured by this firm is presented. Included in the line are electrical buffers, grinders, drills, hot guns, nut setters, polishers, reamer drives, sanders, saws, screw drivers, surfacers, tappers, tire detreaders, valve seat grinders, and accessories. Copy of Catalog No. 56 free upon request.

Coffing Products Catalog No. G-3. In this 24-page catalog, the complete line of products marketed by the Coffing Hoist Co., Danville, Ill., is presented by means of descriptions and photographs. Products covered include spur gear chain hoists, utility maintenance tools, differential chain hoists, trolleys, ratchet lever hoists, spur gear gravity hoists, electric hoists, and load binders. Also included are numerous application photographs of the various pieces of Coffing equipment. Copy of Catalog No. G-3 free upon request.

Fansteel I T & T Selenium Rectifiers Bulletin FI-3. This eight-page bulletin, publication of the Fansteel Metallurgical Corp., North Chicago, Ill., explains the principle of the selenium dry plate rectifier and enumerates its characteristics and advantages. Recommended circuit arrangements are detailed and illustrated with wiring diagrams.

In addition, several types of complete selenium rectifiers for battery charging and d.c. power supply, and numerous types of selenium rectifier elements are described and illustrated. Copy of Bulletin FI-3 free upon request.

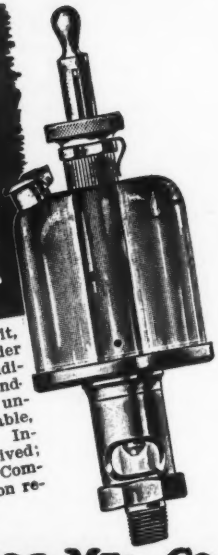
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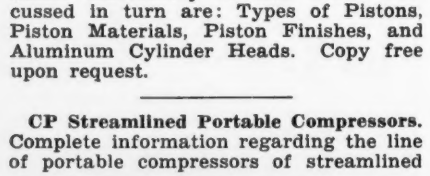
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Aluminum Pistons and Aluminum Cylinder Heads, products of the Aluminum Co. of America, Pittsburgh, Pa., are the subject of an informative and illustrated 48-page booklet prepared by the Dynamic Laboratory of this firm. Discussed in turn are: Types of Pistons, Piston Materials, Piston Finishes, and Aluminum Cylinder Heads. Copy free upon request.

CP Streamlined Portable Compressors. Complete information regarding the line of portable compressors of streamlined design offered by the Chicago Pneumatic Tool Co., 6 E. 44th St., New York N. Y., is contained in a 28-page profusely illustrated bulletin which is now being issued by this firm. Copy of Bulletin 758 will be sent free to anyone requesting it on his company letterhead.



Hammond Equipment Leaflets. A series of leaflets illustrating and describing Hammond High Speed Radial Drilling and Tapping Machines, Bracket Drills, Type G Radials, and No. 2 Surface Grinders are now being distributed by The Hammond Mfg. Co., 3089 E. 80th St., Cleveland, Ohio. Leaflets free upon request.

Johnson Friction Clutches, standard and Super-Johnson types, are covered in detail in a 10-page, revised data catalog issued by The Carlyle Johnson Machine Co., 52 Main St., Manchester, Conn. Included with the catalog is a separate dimensioned bulletin, Series No. 1, regarding Johnson "Maxitorq" Multiple Disc Type Clutches. Copy of catalog with bulletin free upon request.



Bound Brook "Compo" Bearing Stock List No. 1. The Bound Brook Oil-Less Bearing Co., Bound Brook, N. J., is now issuing Stock List No. 1 on "Compo" Porous Bronze Oil-Retaining Bearings in which many sizes of bearings are tabulated, supplemented by valuable information to designing engineers with regard to permissible loads, shaft clearances, and installations. Copy free upon request.



Safety "Rite-Speed" Grinders. Bulletin F-28-3 describing and illustrating Safety "Rite-Speed" Grinders for light and heavy work has been prepared for distribution by The Safety Grinding Wheel & Machine Co., P. O. 746, Springfield, Ohio. Complete specifications are listed. Copy free upon request.

Magnus Skin-Gard, a cream which when rubbed into the skin is said to protect it against chemicals, solvents, and dirt of all kinds as well as against dangerous infection, annoying cracks, and abrasions, is the subject of a descriptive and illustrated four-page folder now being issued by the Magnus Chemical Co., Inc., Garwood, N. J. Workers whose skin comes in contact with solvents are said to find Skin-Gard beneficial in preventing the solvents from removing natural oils in the skin. Magnus Skin-Gard is supplied in two grades: namely, regular and waterproof, both of which are described in the folder. The folder also discusses in detail the classifications and cause of industrial dermatitis and its prevention. Copy free upon request.



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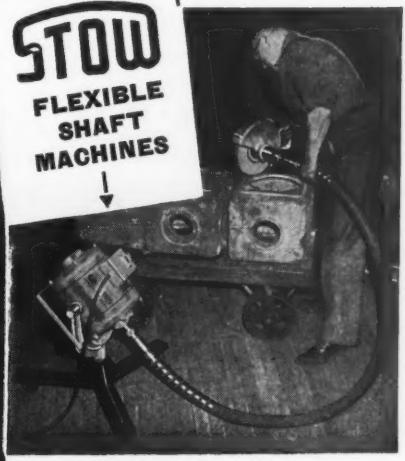
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OTC Catalog No. 31. This catal- publication of the Owatonna Tool C 357 Cedar St., Owatonna, Minn., c tains 160 pages describing OTC aut tive and industrial maintenance to including the OTC pulling system w capacities from 5 to 50 tons. Copy f upon request.

"The Answer to Industrial Der titis" is the title of a 44-page book now being issued by The Milburn C 905 Henry St., Detroit, Mich. The boo let describes the various causes a means of prevention and protecti against industrial skin diseases, a enumerates ten different kinds creams and ointments for specific app cations as related to: (1) Paints, la quers, varnishes, greases, and so o (2) Oils (mineral, animal, or vegetable cutting and drawing compounds and p troleum distillates, or solvents, as w as hydrocarbon solvents and their der atives. (3) Acids and alkalies, eith solids or aqueous solutions.

Included in the booklet, too, is a 1 page scientific study of skin structu and composition and the underlyi principles of skin injury in relation industrial dermatitis.

According to United States Pub Health Service Departments, 65 per ce of occupational diseases are skin affli tions—about 20,000 afflicted workers lo time from work annually—average com pensated case loses ten weeks—cos $100 for compensation and $90 for me cal care—annual estimated loss $4,000,0 (these figures include only cases re ported for compensation in 1934, cov ing only nine states). In 1940 there w 29 states carrying definite compensati schedules for industrial skin disease Copy free to any mechanical executi upon request.



"The Welding of Republic Enduro Stainless Steel" is the title of a 20-page booklet released by Republic Steel Corporation, Cleveland, Ohio. The booklet is profusely illustrated and contains up-to-the-minute data on the welding of stainless steel by various commercial methods, including electric arc, atomic hydrogen, flash, projection, seam, spot, and gas. Brazing and silver soldering are also treated. A feature of the booklet is a section containing a large number of drawings demonstrating the proper design of welded joints for stainless steel construction.

Copy of the booklet available upon request.

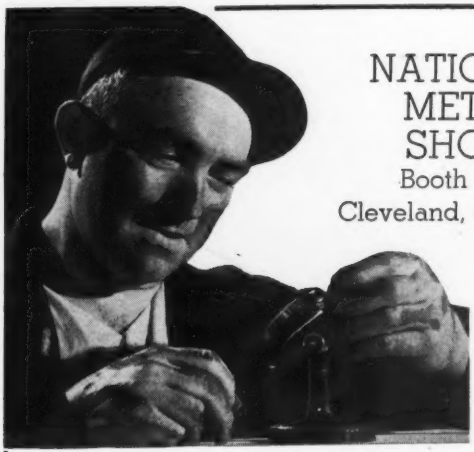
Crucible Cold Rolled Folder. A 12-page folder containing useful data on cold rolled and cold drawn specialty steels has been prepared for distribution by the Crucible Steel Co. of America, 405 Lexington Ave., New York, N. Y. Tables included in the folder have been simplified by the exclusion of matter which does not apply to the higher carbon quality steels. Weight per thousand feet of cold rolled spring steel, hardness conversion numbers and decimal equivalents for various thickness gauges are included.

An interesting feature is a list of steels as they are known by distinctive names or purposes. Method of manufacture is mentioned briefly with special reference given to the finishing of tempered spring steel.

Copy free upon request.

"Unisorb in the Industrial Plant." The material contained in this 24-page illustrated booklet is, according to The Felters Co., Inc., 210 South St., Boston, Mass., arranged to emphasize the fact that the use of Unisorb felt as a base or mounting for industrial machinery achieves three objectives; namely, simplified machine installation, lower maintenance costs, and vibration and noise control.

Copy of the booklet can be obtained by writing to Dept. 1-4 of The Felters Co., Inc., at the above address.



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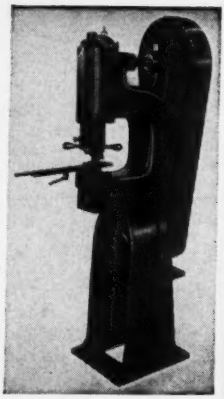
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Where excessive heat and open flame are dangerous, or injurious to the metal being cut, the Savage Nibbling Machine meets the requirement.

Capacities to 7/8".

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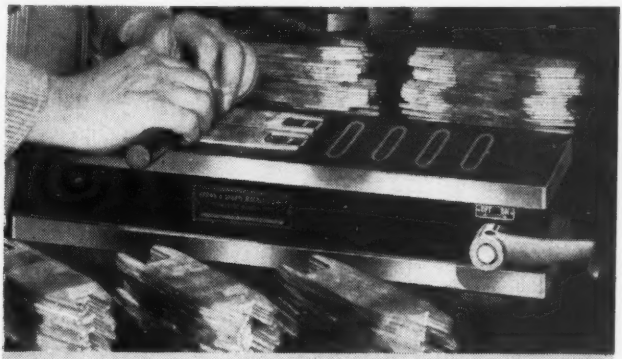
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Gisholt Performance Data Sheets Nos. 54 to 57 are now available from the Gisholt Machine Co., 1219 E. Washington Ave., Madison, Wis. The sheets include case studies in metal turning using automatic and turret lathes, and a typical example of static-dynamic balancing on a Gisholt Dynetric Balancing Machine. The balancing data covers the procedure followed by a manufacturer of ventilating fans in order to locate, measure, and correct unbalance in them. Detailed description of the methods employed for each step is included in the data.

The metal-turning installation stories deal with actual machining procedures followed by manufacturers of automobiles, stokers, and portable compressors using Gisholt Turret Lathes and Automatic Lathes. Actual tooling layouts are clearly illustrated for each job. Operation sequences, feeds, speeds, and maching times are also given. Data sheets Nos. 54 to 57 free upon request.

Williams Torque "Measurrench" No. S-57. In this six-page folder, prepared by J. H. Williams & Co., 260 Lafayette St., New York, N. Y., the Williams Torque "Measurrench" No. S-57 with reversible ratchet and torque-indicating signal for precision measurement of right hand torque is described and illustrated. The "Measurrench" is designed especially for use with Williams' Standard "Supersockets," but can be applied to any detachable sockets having ½-in. square drive - opening. Copy free upon request.

Peerless Universal Metal Cutting Saw Bulletin No. 51. In this eight-page bulletin, the full line of universal metal cutting saws available from the Peerless Machine Co., Racine, Wis., is described and illustrated. Special phantom drawings illustrate the design and function of a novel, patented, four-sided saw frame. The construction of the frame permits the use of a backing plate for supporting the hack saw blade which is tensioned in the center of the frame instead of at the bottom. The value of a saw of this type for extremely heavy metal cutting is substantiated by tables of cutting speeds. Copy free.



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New bulletin issued by Gisholt Machine Co., 1219 E. Washington Ave., Madison, Wis., presents the story on Gisholt High Production Turret Lathes.

2. Cutter Grinder

Catalog M-777 details the Cincinnati No. 2 Cutter and Tool Grinder. The Cincinnati Milling Machine Co., Cincinnati, Ohio.

3. Gear Shaper

"The Fellows Method," a new book released by The Fellows Gear Shaper Co., 78 River St., Springfield, Vt., presents much valuable information on gear shaping methods.

4. Collets and Feed Fingers

Sutton screw machine collets and feed fingers are completely detailed in catalog available from Sutton Tool Co., 2895 W. Grand Blvd., Detroit, Michigan.

5. Contour Machining Handbook

New handbook on contour machining presenting 158 pages of valuable metalworking helps may be obtained from Continental Machines, Inc., 1306 S. Washington Ave., Minneapolis, Minnesota.

6. Portable Electric Hoist

Bulletin featuring portable electric 'Budgit' Hoists as well as "Time Savings Calculator" showing savings to be earned, is available from Shaw-Box Crane & Hoist Div., Manning, Maxwell & Moore, Inc., 440 Broadway, Muskegon, Michigan.

7. Profiler and Milling Machine

Morey Machinery Co., Inc., 410 Broome St., New York, N. Y., has issued Bulletin 12M featuring new high speed vertical Profiler and Milling Machine.

8. Magnetic Chucks

Walker Magnetic Chucks and standard rotary chucks are illustrated and described in Circular W4. O. S. Walker Co., Inc., Worcester, Mass.

9. Speed Reducers

Catalog 438 gives complete description and specifications of Farrel speed reducing and speed increasing units. Farrel-Birmingham Co. Inc., 381 Vulcan St., Buffalo, N. Y.

10. Steel Users' Data Sheets

Data sheets for users of alloy steels are available from Wheelock, Lovejoy & Co., Inc., 130 Sidney St., Cambridge, Massachusetts.

11. End Mills

The Weldon Tool Co., 3000 Woodhill Rd., Cleveland, Ohio, has issued new catalog No. 8 detailing the Weldon line of end mills.

12. Bearings

New catalog just issued by Ahlberg Bearing Co., 3029 W. 47th St., Chicago, Ill., contains much usable data on the proper selection and maintenance of anti-friction bearings.

13. Broaching Tools

"Problems Solved by Broaching" is the title of a booklet available from and issued by Ex-Cell-O Corporation, 1206 Oakman Blvd., Detroit, Michigan.

14. Hack Saw Machines

Bulletin No. 600, issued by Armstrong-Blum Mfg. Co., 5700 Bloomingdale Ave., Chicago, Ill., details the Marvel 6A and 9A hack saws.

15. **Ground Flat Stock**

Ground flat stock folder MD and handy reference wall chart for the toolroom may be obtained from The L. S. Starrett Co., Athol, Mass.

16. **Cerromatrix Manual**

This 36-page booklet is filled with useful and interesting information about Cerromatrix, the versatile alloy for metal-working shops. Cerro De Pasco Copper Corp., 40 Wall St., New York, N. Y.

17. **Chaser Grinder**

Bulletin No. 20, issued by The Geometric Tool Co., New Haven, Conn., illustrates and describes the Geometric Chaser Grinder.

18. **Air Cylinders**

Catalog 36-A presents details on the T-J Cushioned Air Cylinders. Avail- from Tomkins-Johnson Co., 620 N. Mechanic St., Jackson, Michigan.

19. **Air Control Valves**

Bulletin 34-MM illustrates and describes the Hannifin line of packless air control valves. Hannifin Mfg. Co., 621 S. Kolmar Ave., Chicago, Illinois.

20. **Ground Cutters and Rotary Files**

Catalog available from M. A. Ford Mfg. Co., 408 Pershing Ave., Davenport, Iowa, presents information on Ford ground cutters and Ford handcut rotary files.

21. **Carbide Tool Grinder**

Bulletin CTG 410M details the K-O Carbide Tool Grinder. K. O. Lee Co., Aberdeen, South Dakota.

22. **Grinding Wheel Data Book**

The Safety Grinding Wheel & Machine Co., Springfield, Ohio, has available 80-page book, No. W-36, presenting valuable grinding wheel data.

23. **Flexible Coolant Lines**

Folder featuring flexible oil feed and coolant lines is available from American Metal Hose Branch, The American Brass Co., Waterbury, Connecticut.

24. **Radiation Pyrometer**

Pyro Radiation Pyrometer is presented in illustrated bulletin 100, Pyrometer Instrument Co., 101 Lafayette St., New York, N. Y.

25. **Square Frame Arc Welder**

Harnischfeger Corporation, Milwaukee, Wis., has just released descriptive folder featuring the new P&H-Hansen WD-150 square frame are welder.

26 **Drilling and Tapping Machines**

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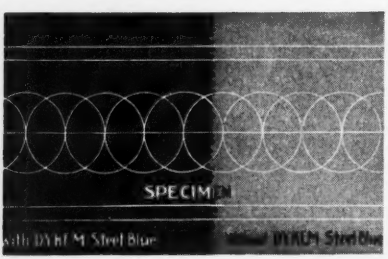
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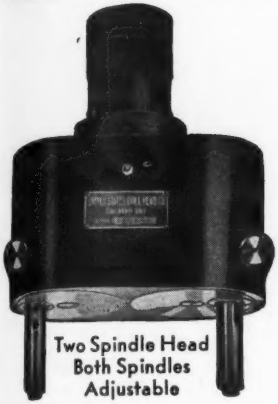
West Bend Spring Bearing Truck Complete information regarding the line of spring bearing material handling trucks manufactured by the West Bend Equipment Corp., West Bend, Wis., is given in an eight-page illustrated bulletin, designated as No. 236, now being published by this firm. Copy free upon request.

Illinois Tool Works Catalog "E," an invaluable ready reference 292-page handbook containing much useful engineering data on metal cutting tools as well as illustrating and describing the Illinois line of products, has been prepared by the Illinois Tool Works, 2501 N. Keeler Ave., Chicago, Ill. The catalog is graphically illustrated with easily understood drawings explaining many common shop problems, and summarizes more than a quarter century of Illinois experience in designing and manufacturing precision cutting tools for the metal working industries.

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U. S. HEADS

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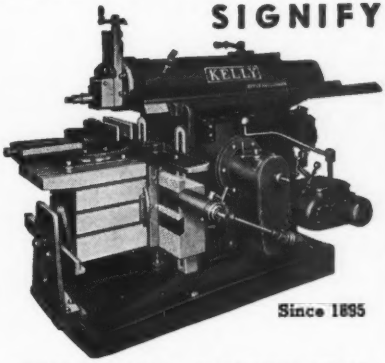
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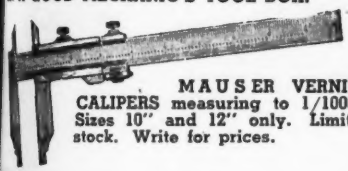
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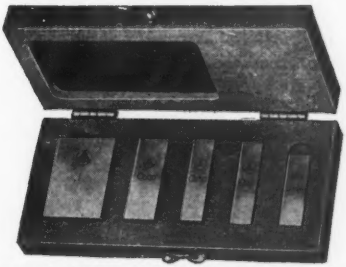
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